

Don't Be Afraid. Don't Be Very Afraid

Arguments to Unseat the Argument for Fearing Aliens

by D.C. Ceva



You know the drill, in Hollywood and elsewhere. Alien invaders come here, and it's war, an uneven war between an overwhelming force with advanced weaponry and us, and it doesn't look good for us. Or they come for other reasons, but we're still frightened. Frightened because that's what we know, whenever a technologically more advanced society has visited a less advanced one here on Earth it has ended bitterly for the latter throughout history. The former version is common because it involves more guns and action, the other is more appreciated by aficionados who had enough of all this gun-fighting and want something else.

Science fiction is one thing. But the argument of there being a danger in an alien civilization learning about our whereabouts, that perception of danger resulting from this civilization being yet unknown to us, but, should they be able to come here, definitely a lot more advanced technologically, and from this our experience with such encounters on our own planet alone, is one that's been made by some of those who know a lot more about the cosmos than most of us do. When Stephen Hawking warns us about seeking out alien civilizations orbiting other stars and then trying to contact them, letting them know about us, warns us for this very reason, the argument will have weight, because he had.¹ His credentials definitely speak for themselves.

¹ <https://www.theguardian.com/commentisfree/2010/apr/26/stephen-hawking-issues-warning-on-aliens>
Professor Hawking clearly took the issue very seriously, as he issued the warning repeatedly

So the first question, when wanting to reach a conclusion independently, is therefore: can I actually? Do I first have to become an astrophysicist? Do I have to at least approach the speed of Prof. Hawking's synaptic sparks?

The answer is that the best credentials are not an argument, that the most formidable academics are capable of making mistakes, and that, yes, you can, provided you do a little homework. And you should always be enthusiastic about contradicting your professor.

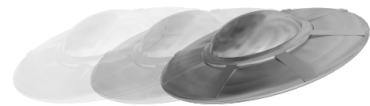
That homework is the information relating to the subject, and the information relating to this one is by now freely available, and in enough a comprehensive form that it will suffice. It has been provided by Hawking et al, by the small, diligent, formidable army of astronomers of the past centuries until now. And at the point where such information becomes this sufficient to enable thinking about the given subject seriously conclusions about it will be of a philosophical nature – in the strict sense of the word, where philosophy is regarded and treated as a science itself. Which is a long way of saying, 'who am I to contradict The Hawk?'²

The effort is not meant to be l'art pour l'art. There are possible implications that may result from Prof. Hawking's warning, actual consequences, should his view become the commonly accepted, and he was not the only one. Professor Michio Kaku echoed the same concerns.³ It is good to trust our scientists, we should. It's better to listen to *more* scientists, though, should there be a dissenting view that is well argued. The public prefers shortcuts, however, and here we have two of the best known ones voicing the same warning.

There is a brief and a long way to counter their arguments. And all lengths in between. You know what they say: if you need a whole book making your argument it's a sign you don't know how. I disagree. Sometimes a set of arguments contradicting a particular viewpoint can be compelling *because* there are so many facets to it, e.g. the debate about religion. Also, a brief summary can escape the masses easier, one that consists of conclusions only may make it hard for others to follow. The essence of my line of thought has already been expressed, for instance by Professors Carl Sagan and Philip Morrison, on one occasion even at the same occasion.⁴ I can only assume that their words have escaped both Professors Hawking and Kaku, or that they have disagreed with them.

Besides this, I find thinking about this question, if it is done in a diligent fashion, highly rewarding, as it requires thinking about a lot more, much of which is very relevant to our own species, and it opens the gates to a flood of more considerations, too.

So. You're invited to follow me.



2 The IT Crowd, created by Graham Linehan, Season 03, Episode 04 'The Speech'

3 https://www.youtube.com/watch?v=IGjj73b4DGE&ab_channel=TheLateShowwithStephenColbert
Professor Kaku is actually a proponent of the SETI program, but where it involves making a prospective alien civilization aware of us his concerns are one with Prof. Hawking's

4 Life Beyond Earth and the Mind of Man, Symposium – a video with excerpts can be viewed here:
https://www.youtube.com/watch?v=cQeOp7a8QMI&list=WL&index=94&ab_channel=USNationalArchives
Full transcript:
<https://ntrs.nasa.gov/api/citations/19730022075/downloads/19730022075.pdf>
Carl Sagan: https://en.wikipedia.org/wiki/Carl_Sagan
Philip Morrison: https://en.wikipedia.org/wiki/Philip_Morrison

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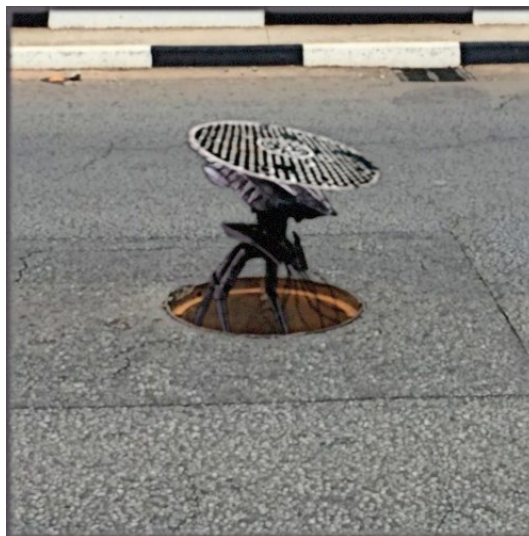
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Prologue: The Premise

‘...regarded this earth with envious eyes, and slowly and surely drew their plans against us.’⁵ First major planet invasion story that I know of, H.G. Wells, ‘The War of the Worlds’. Good stuff. And it’s got kind of a ‘Jaws’-effect on us, and it’s really similar to how many of us feel towards the noble sharks in quite a few ways.⁶



⁵ H.G. Wells - The War of the Worlds, 1887 Pearson's Magazine (serialized), 1889 William Heinemann (novel)

⁶ Jaws, 1975, written by Peter Benchley & Carl Gottlieb, directed by Steven Spielberg

So what's the idea here, what drew so many more stories, many in moving picture format, that dealt with aliens invading Earth, what drives the fear? What's the premise? We could tackle that very briefly, not much is needed, but the premise demands a little more information still, as to the How, and what this How implies. Which, at first, may make you even more worried, but as it is with things we have a better look at...

So there is the fear, and its justification, and then there is the reason for why some argue we shouldn't just be afraid, but very afraid.

The fear quite simply results from looking back at us, at our history, a history that is still ongoing, and seeing that whenever a technologically more advanced civilization has met an in respect technologically less advanced civilization things have frequently if not even generally ended up badly for the less advanced one; I'm using the more fashionable word 'civilization' as more often applied, though 'society' would be the more accurate one, we'll see why later. Ending badly, in any case, as in real badly. Nasty. We're talking slavery, we're talking mass murder. We're talking genocide. That part is sadly and undoubtedly true: our report card reads like that of a murderously insane child.

When extrapolating this to the idea of aliens coming over the question of which side would be the technologically more advanced doesn't even have to pop up. It'd be them, and for one, simple reason: they'd be the ones coming over.

This is really important for both arguments to battle. Blockbuster science fiction movies either omit the question of how the fearsome aliens manage to do that, or they show us an effect that'll appropriately seem like Clarkean magic to us, or they'll use the fabled hyper-drive.⁷ They do, however, what them coming here implies they could, implied is the technological advance – the aliens can lay waste to entire strips of landscape, we can't (or we can, but those landscapes are pretty useless afterwards). The aliens can suck entire oceans empty, we can't. The aliens have laser-guns, we only just began guiding missiles that way.

But it's really the number one indicator. Them hanging in the sky. Having come all this way. A long way. And from there we can reduce the actual premise, the premise as would be before we'd find out whether they'd come with hostile intentions or a cosmic dove, to two plain statements.

The nearest other star system is the Centauri system, a triple star system, so one more bar on the Luke Skywalker-theme.⁸ Proxima Centauri and her sister, Proxima Centauri b lie just a little over 4.24 light years from us (Alpha Centauri a little over 4.3).

A light year measures about 9.46 trillion kilometers.

From here to the Proxima sisters it's a leisurely stroll of just over 40.1 trillion km.

One of our fastest spacecraft, Voyager 1, goes at about 17.3 km per second.

7 'Any sufficiently advanced technology is indistinguishable from magic.' This quote by Arthur C. Clarke is the most famous of his '3 Laws'. Arthur C. Clarke: https://en.wikipedia.org/wiki/Arthur_C._Clarke

8 https://en.wikipedia.org/wiki/Alpha_Centauri Needless to say, those figures are rounded up, and as with all figures presented here the author will appreciate any correction of mistakes
Star Wars: Episode IV – A New Hope, 1977, written & directed by George Lucas

If we were to redirect Voyager 1 onto a trajectory to the Proximas, and provided it remains functional for the duration of the trip, it would happily report back to us in about 73 000 years.

Well. Make that twice as long for the 'I made it!' to arrive back here.

That's what we're dealing with. Remember, back in the days, 73 000 years ago? I don't know what our ancestors were up to exactly, but I assure you, it wasn't sending spacecraft to other star systems. And any other star system than the fabulous Proxima sisters would take yet much, much longer.

We currently don't know whether it is at all possible for anyone to make it within a feasible time frame. For us right now certainly not. It's a nice idea to send something out for our descendants to benefit from, but in 146 000 years we might no longer exist. Not to mention sending people. One idea, a generation-ship, sounds fancy, but only until one remembers the social problems of plenty the long journey in such a vessel would undoubtedly create, beginning with the first generation (hopefully) being a bunch of volunteers, all right, but already the second generation so not.

Going faster, would seem like the right idea, and it might eventually get us to the Proxima system, and possibly not by solving it with the brute force of ever more majestic propellant, but with subtlety, such as a light sail, or by a combination of the two.⁹ That's still only the most immediate neighbor stars. And eventually we'll hit the limit of how fast we can propel a craft, and even if we don't hit the nearest limit, there's still another one waiting for us.

Ultimately, going ever faster won't be the answer to interstellar travel, not if one wants to go further. In terms of velocity we'd have to look at so-called relativistic speeds, and those can be very inconvenient for travelers. Sounds great, doesn't it, approaching the speed of light?

I'd like to use the term in a broader sense at first, perhaps a little inaccurately: anything that reaches a fraction of the speed of light worth mentioning – nothing we can currently build does. Not by far. Far from a mere percent.

The first hurdle to managing that is that the universe is packed with annoying laws, one of them being the law of conservation.¹⁰ Simply speaking, the faster you go, the more mass you'll take on. The more mass you take on, the more energy you'll have to expend. You'll have to expend a hell of a lot of energy to reach a fraction of the speed of light.

Which is why anything that reaches something *approaching* the speed of light, true relativistic speeds, that is, is beginning to do away with the whole mass-problem. Atoms are being stripped of their electrons, matter is turned into plasma. The next hurdle, I can't imagine traveling as plasma as being very pleasurable. *At* the speed of light, finally, there's no need to think of mass anymore because you can only go at that speed if you don't have any. You as in you, and I as in I, we will have mass for as long as we can remember that we have it.

But suppose we'd find a way to negate all that. Suppose we'd be able to travel at the speed of light or near it without all those troubles resulting from those party-pooing laws. In that case it would still be highly advisable not to go with 'or'. Don't go *near* the speed of light. Don't. I mean it. Go straight to full throttle zero to 300 000 km per second. That's your only answer, also bring a good

⁹ <https://www.planetary.org/sci-tech/lightsail>

¹⁰ https://en.wikipedia.org/wiki/Mass%E2%80%93energy_equivalence#Conservation_of_mass_and_energy

coordination system. Do not, and that's the immeasurable trick, do *not* first accelerate to reach it. If you do, that means you begin somewhere below the speed of light, and make yourself comfortable.¹¹

Time dilation in the context of speed: the faster you go, the slower time will pass for you relative to another slower moving person or object. Ever slower, the faster you go. Where does that end? At the speed of light. Where time stops. Brilliant if you can start at the end. Anything below, and most uncomfortably so somewhere closely below, somewhere just below the speed of light: welcome to what'll be eternity to you.

Interstellar travel is problematic. And yet. Our premise says that's aliens up there in our skies. Strange looking alien ships, with probably strange looking, certainly very smart aliens on board. Very smart because they're here. They've accomplished something we don't even knew was possible. We only dreamed about it, some more constructively than others, but a dream it was. And yet here they are.

That's why we can be sure they'd be technologically far advanced over us.

The only way they could have managed the distance is by any of one or more means that are as of yet even more alien to us than they'd be: while we can calculate a good chance that there have been, are and will be other civilizations out there, we don't yet know the means for feasible interstellar travel, if there are any – remember, whether they come with candies or with laser-blasters to take our water, diamonds and women, it's no good if when you get home with your spoils and the folks there won't so much ask you who you are, but more likely *what* you are.

In short, the two plain statements are, they'd be far more advanced than us because a) they found a way to travel between the stars, and b) that way would have to be feasible, meaning allowing them to go back home, and with home still being home when they return. Those two statements are the mantra for interstellar travel.

Some ideas excite and tantalize the engaged minds, be it because you know your physics or because you're a scifi writer (or for the latter, preferably, both). Wormholes is the word, for example. Theoretically not forbidden by the cosmos, and that's always a good start. Probably not occurring naturally, though. Requiring enormous amounts of energy to keep open long enough. But then, hey, they're supposed to be smart, them aliens.

Whatever it may be, it has factored into our premise, for here they are. For all of us to see, in their ominous, spiky, orange-pink spaceships.

Will they be nice to us?

That they're here, despite all the above, that they're this far more advanced, would bode unwell if those cautioning against us giving away our position were right in their blackest fears. The only good news then would be that we wouldn't have to wreck our comparably peanutty brains for a way of how to defend ourselves against them, because there wouldn't be one. We'd be lunch, and we'd be already served.

11 An interesting question is whether you'd be even aware of the dilation, of spending time in what'd approach eternity for you, or whether everything that amounts to your brain function will be subject to the effect in the same way

The bad news would be already now that just shutting ourselves down, stopping to shine, stopping to radiate, stopping to ping all signals that could escape Earth, assuming that were possible, basically regressing back to the middle ages, would in all likelihood not prevent them from spotting us. Us dummies, we have already begun reading the atmospheres on far away exoplanets.

But *would* they be hostile?

We don't know anything about them, do we. We don't even know whether they'd be, like us, carbon-based. If we don't know anything about them, because they are at this point still hypothetical, no matter what – well, then we can't tell, can we. And if we can't tell, then we have to factor in a good chance that they'd *be* hostile. Don't we?

So the question has to be: is that actually true? Is there really nothing we can tell about them?

Before that, however, is there nothing else we can tell about the premise? Why, for instance, would they come in the first place? What would be the inciting reason, and this especially if their intentions were hostile?

1. A Question of Purpose: Spoils

The driver of Hawking's argument, and that of those who came after and before him making it, is the reference to our own behavior throughout history up till now whenever two cultures met on the surface of this one planet. Between two cultures it's very much like between two individuals encountering another, say, two prospective lovers, more commonly one will be the dominant one, and if only ever so slightly. Even more common than with love affairs, when two cultures meet mayhem may soon follow, because the dominance of one over the other has always been determined by better weaponry. That's been traditionally how technological advantage has counted between us, as military might through smarter weapons. It's only since economics have gone world economics that we have begun to develop alternative pressure means to this effect, and I say 'begun', because they still don't serve as a reliable deterrence that often.¹²

Technology, weaponry, those are merely that, however, means, practical means. Between the possibility of bashing the other over the head with a bigger, easier to yield club and the actual acquisition and use of this club there must be another type of means. After all, we're one species, on the evolutionary tree we're sisters and brothers, and in between individuals it normally isn't actually that easy to use the club to bash out some brains, unless you're a maniac, sadist, serial murderer or act in defense. It has to be made easier by drilling difference into you, by differentiating between you and the enemy, and often times that much can be justified, e.g. when it's the others who are the aggressors. Which can already go out of hands quickly, through abuse and ideology.

But what concerns us most is the preemptive justification by means of degrading. I'm better than you, so I can take your shit. So I can make you a slave. So I can kill you. I can even engrave a prohibition against killing into my holy book, and I can still kill you, because the prohibition is meant for humans, and you're no longer a human, because I said so. Because you have a different

¹² https://en.wikipedia.org/wiki/2022_Russian_invasion_of_Ukraine

skin color. Because you're of a different gender. Because your people are thieves. Because your people murdered our deity. No, he's still around, but you did. Because your people are technologically behind, anyway. Because your people are still half animal.

If there's one bottom line, one smallest denominator blemish of ours, one original sin, if you will, that enables all the murderous conquests and mass murders and -thefts in our history, it's chauvinism. Chauvinism inevitability will lead and has led to rape culture, the rape of individuals, of whole people, and of land and waters. The same chauvinism is also aimed against anything the land includes, we're better and more important than other species, so let's ignore them, let's turn them into pets, imprison them in zoos, slice off their horns, their fins, their heads, their feet, we need ashtrays, after all, and let's kill them where they have weaponry themselves. Since we're at it, the environment is ours, so we can do with it what we want. Which apparently is poisoning and polluting it. And we got *that* in writing in our holy books as well. Rape culture is destructive in the short-term, and self-destructive in the long-term.

So, are we plain evil? Or just insane? Or outright stupid? There are arguments for all three, but generally speaking we still take care of motive, at least superficially, motives that are meant to benefit our caste, our clan, our family, our nation. You know. Andorra First! Naturally there is individual evil, and this individual evil can quickly be expanded to infect entire populations, or at least a whole lot of them. It's not brains doing that, it's ambition. Hitler was no genius, and even for a psychopath he wasn't all that interesting. He was a small-minded, vindictive, jealous, uninspired, untalented, boorish, bitter lower middle-class little man. More than plenty of those around. Had more than enough neighbors like that. Only difference was this quintessence of mad ambition.

And naturally there is the individual evil that will serve itself within a context. It's not orders that will cause the most sadistic atrocities committed in a war or in a torture chamber. It's that war is an opportunity for certain individuals.

But when we view history's movements and changing borders, the incitement is generally of a different type. Stemming from chauvinism, but one with a goal. I'd guess, one conqueror lazily leaning over to the other, asking whether he feels up to some pillaging for the heck of it, kind of boring today, would be the exception (though I by no means rule it out.)

Land, strategic advantage, power, and what the land will bring. The spoils. The resources.

We'll start with those as we venture back to our original premise, the aliens in the sky, and according to Hawking et al, potentially hostile.

Resources have been a potent driver in conquests. We like diamonds. We don't have any growing here. You got plenty. Let's trade. Only kidding, we want your land. How can we say that? Let's see, oh, yeah, easy, you folks got dark skin and we got better weapons, there. We're entitled. Jesus was white, and he gave us our weapons, must be a reason. We'll be nice later, we'll convert you.

Oil. Coal. Uranium. Fertile land. We have a great planet, it's got lots of stuff. Distribution is somewhat down to circumstance, though, which will appear random to some. Bound to lead to conflict for at least some period. Periods.

What resources could be attractive to those aliens? Just to pick one, I'd volunteer water. I'd say it's one of our greatest resources, if not *the* greatest. Water is life. Water waters our crops, water lets us grow, it's excellent against dying of thirst, and it's an ingredient in Scotch. We cook with water, we wash ourselves with water, we make stuff viscous with it, we even cry it. Where water is, living creatures will be, spiders use the thinnest film of moisture to walk up vertical glass. You blow air through it and you'll have a jacuzzi. Hell, we consist largely of water. We couldn't live without water. Water is great.

And we have a lot of it. 70% of our home planet's surface is covered with it. Wide, deep oceans. Lakes, ponds, rivers and creeks, reservoirs and bottles of, swimming pools, and plants and animals storing it. And above all this, gathering as vapor and frequently raining down on us. Truly a lot.

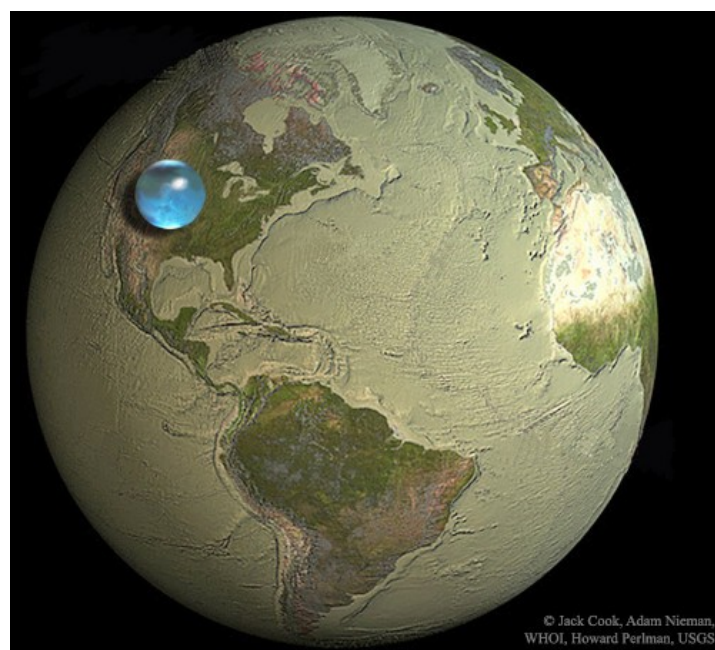
And if I remember correctly, that's been the story in 'Independence Day', hadn't it, aliens coming over with big vacuum cleaners to suck our oceans dry.¹³ Because we have it, and they ran out of it, apparently. Same story as with those diamonds, right?

Take all this water. Take it. Take it, and put it out into space. Bunch it up to a sphere. Actually, you don't have to do that, it'll bunch itself. Now there it is, all of Earth's water as a sphere next to the planet. What do you see? I want you to imagine this for a moment, describe it to yourself before you continue.

Right. So first of all, it's not blue. Water isn't blue, unless something or someone colorizes it. You take a glass out of the ocean, that water isn't blue. When the sky over that ocean is overcast, the oceans surface will appear gray. So it's *not* blue.

What else? Transparent, correct. Well, not completely, but that's largely our fault. Anything else? What about size? How large is this sphere?

Well. It's this size:



13 Independence Day, 1996, written by Dean Devlin & Roland Emmerich, directed by Roland Emmerich

And dammit, they made it blue.

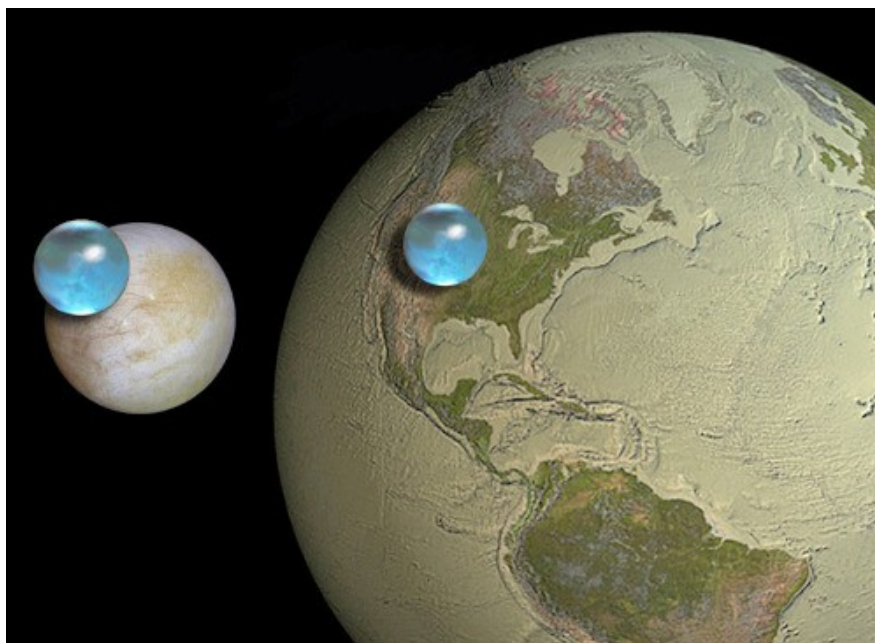
Anyway. Yeah, I'm afraid that's it.

It covers the *surface*, we're not talking subsurface oceans.

Speaking of which, you heard about Europa, the moon, one of Jupiter's?¹⁴



Europa holds a large body of subsurface water, strongly believed to be global, a subsurface ocean. And how does the volume of Europa's water compare to ours?



That's right. There's more water believed to be held beneath Europa's icy shell than we have here on Earth.

Europa is an ice moon. It's mother planet Jupiter exerts gravity on it, of infrequent intensity, basically massaging the moon. This creates warmth, the warmth melting the ice. The same is done

¹⁴ <https://solarsystem.nasa.gov/moons/jupiter-moons/europa/in-depth/>

as caused by the interaction between Jupiter's larger moons, it's now believed, and that's a fairly recent discovery, that it's in fact mainly the other three larger moons that are responsible for the effect.

One other moon known for its water contents, as with Europa probably globally, is Saturn's Enceladus.



Enceladus is a small moon, you can put it down on Wales, but it, too hosts a global ocean, the water of which escapes through cracks in the thinner part of its icy crust, and becomes vapor, through which you can fly a spacecraft to analyze it.¹⁵



15 <https://solarsystem.nasa.gov/moons/saturn-moons/enceladus/in-depth/>

Back over at Jupiter, two of the other larger moons are also candidates, there's Callisto¹⁶ -



possibly, and Ganymede -

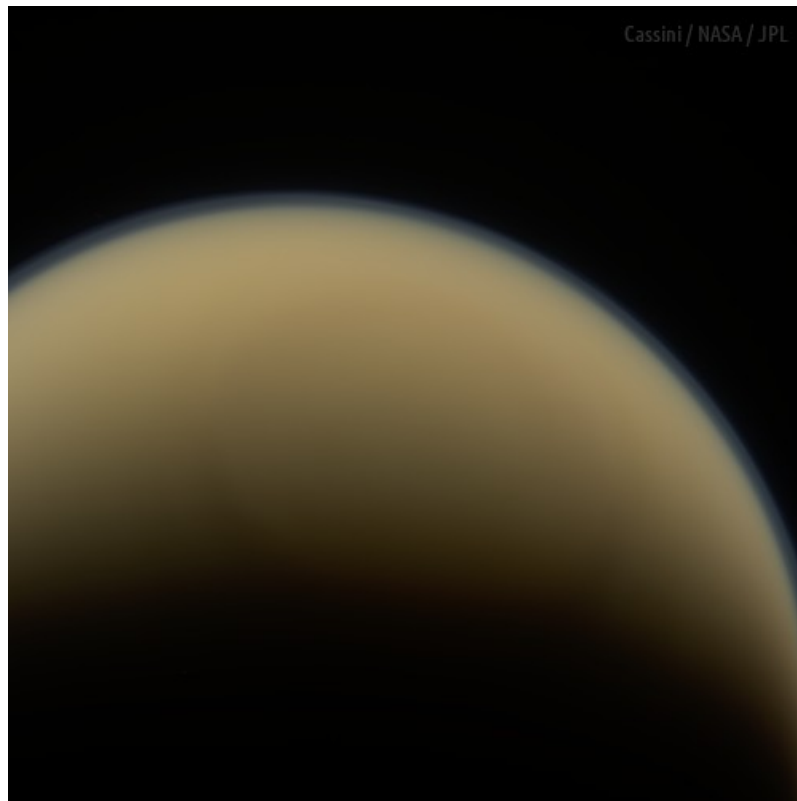


almost certainly.¹⁷ Ganymede is the largest moon in our star system, it's larger than the planet Mercury. If Ganymede's water is also a global ocean, that's a lot of water. And jumping back to

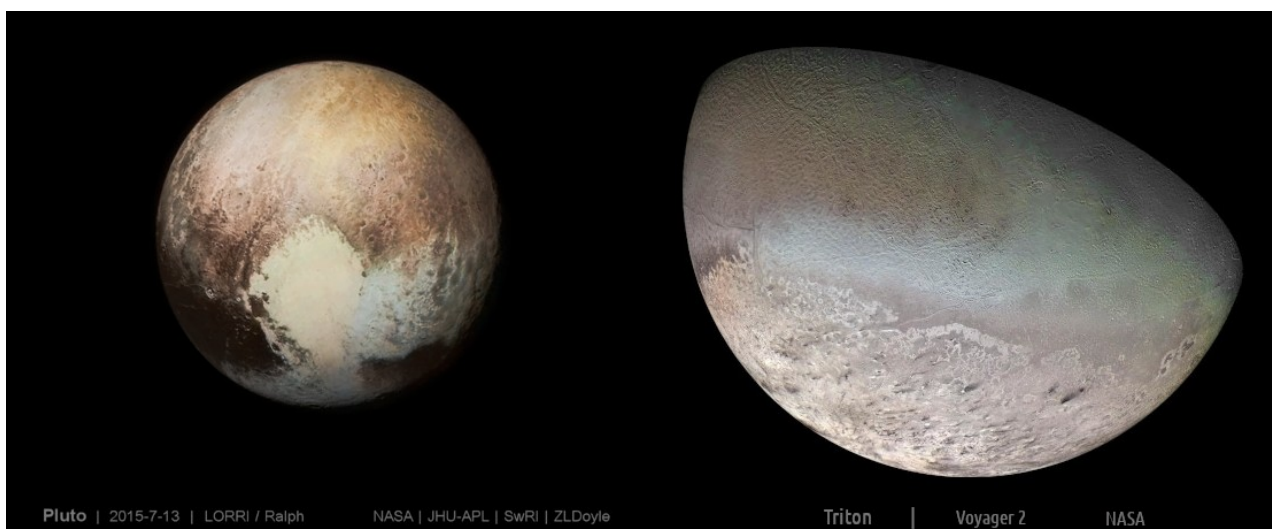
¹⁶ <https://solarsystem.nasa.gov/moons/jupiter-moons/callisto/in-depth/>

¹⁷ <https://solarsystem.nasa.gov/moons/jupiter-moons/ganymede/in-depth/>

Saturn again, the solar system's second-largest moon, Titan, also larger than Mercury, might also hold water underneath its surface.



A few clicks further out, Triton, Neptune's most massive moon, is yet another probable host to large subsurface waters. Triton is special, in that it probably hadn't started its existence as a moon, but appears to be a captive, possibly a former dwarf planet from the system's outskirts, not unlike Pluto, and in fact the one other object in the system looking quite like it.

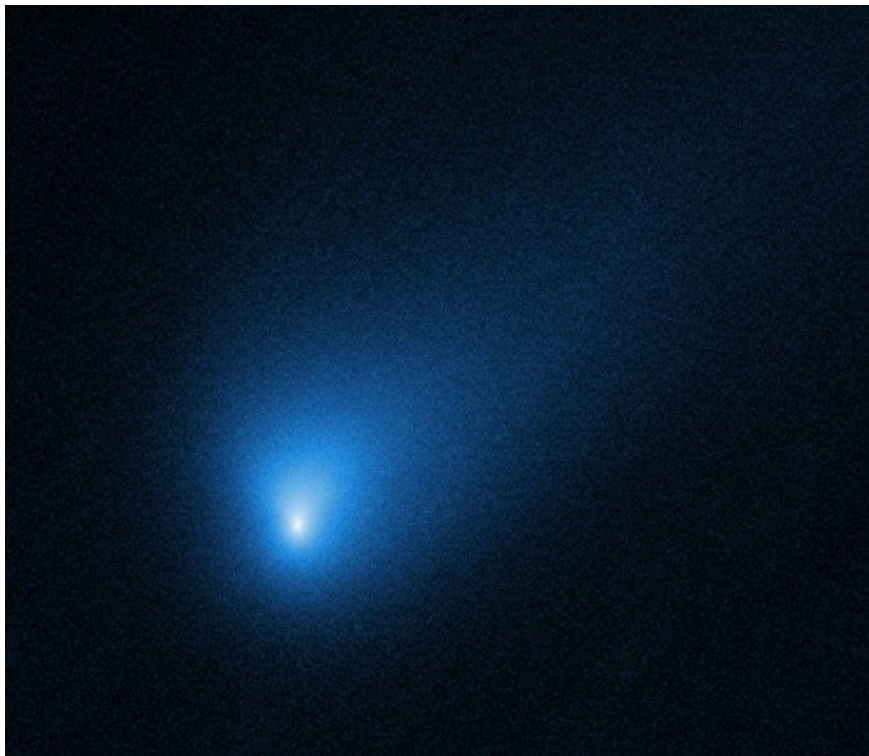


Now, subsurface oceans featured by moons are clearly quite fashionable throughout our system, but that doesn't yet mean they are so in other star systems as well. Or does it? We have discovered exo-

moons around planets in other systems, and we could have assumed there are some before, and probably many more, because we know several ways how moons form. The bottom-line is, while conditions on worlds are different – here virtually every world we have taken a look at is distinguished, and these differences in conditions are environmentally caused, e.g. the freezing point of methane turning it liquid on Titan’s surface while here on Earth we mainly know it in its gaseous matter-state – those different conditions are subject to the same laws of the universe.¹⁸ Hence we can be pretty certain that moons are a commonality, given what we know about their formation. And with moons being the natural satellites to planets, and with many of the observed exoplanets being massive enough to keep their moons, and with moons usually coming in flocks around the more massive planets, and with some of the distances of those planets to their star being large enough, we can assume some of these moons to be icy, and some of that ice to be water ice, with the same conditions of gravitational friction provided by the laws of nature resulting in melt, in subsurface waters.

In other words, yes, you may bet on subsurface ocean moons to be totally en vogue in other star systems, too.

That’s still not all. One of the two visitors from other star systems we recently had, comet 2I-Borisov, turned out to be a perfectly ordinary comet (the other, ‘Oumuamua, was probably a flying slice of a Pluto-like planetoid). Just like many of our comets, because, you know, conditions, natural laws. And yes, comets usually carry a good amount of water, too.¹⁹



C/2I-Borisov, Hubble, NASA

18 <https://solarsystem.nasa.gov/moons/saturn-moons/titan/in-depth/>

19 <https://en.wikipedia.org/wiki/2I/Borisov>
<https://en.wikipedia.org/wiki/%CA%BB'Oumuamua>

As do some asteroids, if you know how to extract it.

And that's still not all.

Here's a pretty picture of the Rosette Nebula:



We distinguish between emission- and reflection nebulae, the latter type reflecting a star's light, while the atoms of emission nebulae are being excited by star radiation, and then there are some nebulae which are both. When observed at specific wavelengths (light should be another of those favorite things of yours), you can tell about the respective nebula's composition, you can see what atoms glow in what color, and you'll get these beautiful images.

Here you got hydrogen, the most abundant element in the universe, in red, you got your sulphur in yellow, you got your oxygen in blue...

By the way, what is water? Chemically speaking? Yes, you know that one. It's H_2O . H = hydrogen, O = oxygen, that's two hydrogen atoms and one oxygen atom for a molecule, there's your water.

Red on the image is hydrogen, blue is oxygen. And from left to right of the nebula it's approximately 65 light years.

Remember, 1 light year = 9.46 trillion km.

Now, those nebulae are not quite what you're used to from 'The Guardians of the Galaxy', the atoms are far more widely spread and you won't have a spacecraft pushing through them and cause this puffy cloud effect (never ceases to have me in stitches), and, as said, you need to look at them

in specific wavelengths to have it this colorful.²⁰ But in principle it shouldn't be all too difficult to combine hydrogen and oxygen to harvest quite a few gallons of Rosette water (couple billions for starters), if you already know how to go the distance. And that's only one of plenty of such nebulae.

Now you take all *this* water, all of it. All the hydrogen-oxygen harvests from all those massive nebulae, the subsurface oceans of moons of all sizes, the water on comets, our large oceans that may well exist on other planets in other star systems as well, all the lakes, rivers, creeks, ponds and reservoirs, all the water flowing through our pipes, and all the water contained in our bodies and those of our cousin species, and don't forget that glass of water on the table before you, and we'll end up with what's known among specialists as *Some Water*.

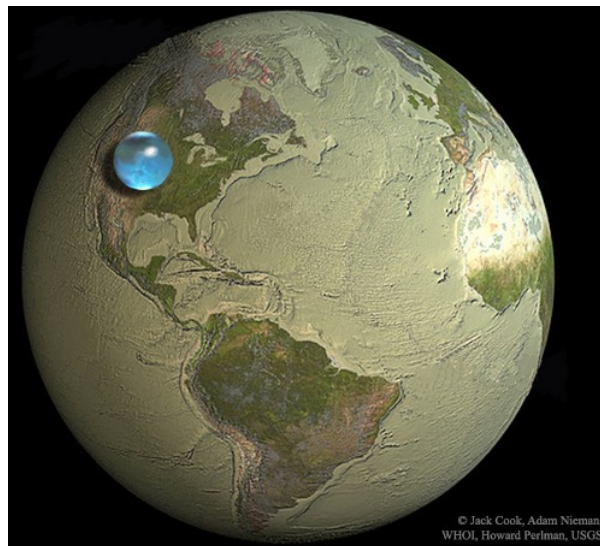
Which finally brings us back. What was our premise again? Right, them aliens hanging in our sky. Having come here. All the way from their home. Feasibly. Which absolutely means that they're technologically way, way, *way*, way, way more advanced. Meaning they have to have reached a considerable age of their civilization.

So.

You tell me.

How likely is it that these aliens are so advanced over us that they can feasibly reach us to steal our water, yet somehow it has completely escaped them that there's all this other water around? For free, all over the place we call the cosmos.

How likely is it that they'll surely have an at least as easy, and probably much easier access to the water ubiquitously present all over the galaxy, and yet they've come for *this puddle*?



I concur. Not very.

And to cut matters short, what goes for water goes for all the other precious resources we have here on Earth.

20 Guardians of the Galaxy, 2014, written by James Gunn & Nicole Perlman, directed by James Gunn

Oil, for, you know, their shaking, puffing, steampunk flying saucers? Fossil resources will be available to find on plenty of worlds, including closer to home. If they still want them.

How about those diamonds? Conditions resulting in the high pressure natural production of diamonds are the same on other worlds. And did you know that at a certain depth they exist within Jupiter's atmosphere, and that it *rains* those things there?²¹

Name your resource, you'll find it elsewhere. Even if they're more conquistador-like and lust after gold, there are supernovae that produce far more gold than there is, ever has been and ever will be on Earth.

The resources we create, that can't be found 'naturally' on Earth, like plutonium? We don't really invent anything. We only invent arrangements, those arrangements work according to natural laws, so we no more than discover, the rest is engineering. But yeah, plutonium is something we have to create with effort, but we only can because what we need to make it already exists. And we do this as dumb apes, compared to our celestial visitors. You wanna tell me that they're doing their wormhole magic, but don't know how to make plutonium? It's just that they'd likely ask us why we still produce this poisonous, dangerous stuff.

But, a-haha, what about human resources? Slaves. Seen that in the movies, too.

I don't know about your lofty economic circumstances, but at least I know people who know people who know people, who feel their jobs are threatened by automation. If you're already cruel enough to see slavery as cool, then yes, that would be a resource, but it's a resource you'll need resources for, food, water. We already build robots, and not only to serve in Sushi restaurants. Make your robots smart enough to act autonomously, but not too smart so they can feel hurt, abused and exploited, and you can lean back and chill. As for the ethical problem of using forced labor, and whether this would potentially impede any hypothetical alien ambition to enslave us besides it simply not being practical, more about that later.

So I'd say we can safely disregard resources as the incitement for aliens to come here, whatever the actual intentions may be.

They won't come for our resources. They just won't. Nevermind that this is still the premise of most scifi movies where the aliens are the reptilian and, for some reason, usually stark-naked villains. It's not ours.



21 Actually not only on Jupiter:

<https://www.space.com/23135-diamond-rain-jupiter-saturn.html>

<https://www.nasa.gov/mediacast/gravity-assist-it-s-raining-diamonds-on-these-planets>

2. Another Question of Purpose: Real Estate

So if the insidious aliens don't need the stuff we have on Earth, the stuff we find, dig and pump out, more stuff we make out of all this stuff, if they don't even appreciate our water because there's so much more of it all over the place we call galaxy, universe, maybe they'll just come for Earth as a suitable environment. Technically that counts as resource as well, and it didn't end too well for Wells' murderous Martians, though they had to be pretty similar to us that they could have fallen victim to zoonosis this quickly.

But very well, when counting resources things like fresh air often aren't even mentioned, which may explain some things. Air, yeah, that's just around, isn't it. Precisely. Around the planet, which is a rough sphere, so yes, around. It's a little confusing to define its outward border, if we, for convenience's sake, use the Kármán Line, because that's the border set for general convenience (Kármán himself said that at this altitude aerodynamics end and astronautics begin, so why not), that's 100 km out, just above where the thermosphere begins.²² You know, where the Aurora lives. Someone calculated 51 trillion trillion m³ of what we call air, I believe by using the Kármán Line as demarcation. That's a lot of air, right? If you've deployed a non-committal grunt to accompany a shy smile of uncertainty just now – you remembered!

It's actually a good opening when countering a climate change denier. 100 km to space. See what town or city lies 100 km from yours. That's it, only in the vertical. In the climate change debate we should no longer have, it could be more, point is, it's a *finite volume*, containing a certain amount of greenhouse gases to keep us warm, and when you start adding copious amounts of it... The max. amount of carbon dioxide, for instance, necessary to keep Earth warm enough for liquid water lies with 0.04%. Pre-delivered. Compare that with Mars' 95%, but Mars' atmosphere has been mostly blown off by the solar wind, and its total is about 1% compared of that of Earth's. Anyway, look up the amounts we're blowing into the atmosphere to add to those 0.04%.

Mostly our atmosphere is made of nitrogen, to a little over 78%. Oxygen comes only 2nd, with just under 21%. Yeah, again, 'm'fraid that's it. Next up argon, 0.93%, carbon dioxide only comes 4th (still). There's also water vapor, but that varies, depending where you are, amounting to a total of about 0.4%. Any other gases are below all that, and should better remain so.

So that's our atmosphere. For now. Wasn't always like that. Atmospheres change, naturally over hundreds of millions, if not billions of years, though with human assistance that can be shortened to a change beginning within less than a hundred years. As currently observable. A planet's atmosphere changing means the planet is changing, from one planet into another. Earth didn't start out as a haven for the species living on it now. Were you to time-travel back to Earth I (preferably within a time machine that's also a spaceship, or else use a real good coordinating system), you'd pretty much instantly die should you forget your oxygen tank. You can't breathe hydrogen, and that's what early Earth's atmosphere was composed of. Nitrogen came later. So did carbon gases, probably first emitted by volcanoes and interacting with rock and water. Free-floating oxygen wasn't possible for long, until what can be described as the great oxygen wars, supported by organisms in the oceans who learned how to photosynthesize.

22 https://en.wikipedia.org/wiki/K%C3%A1rm%C3%A1n_line

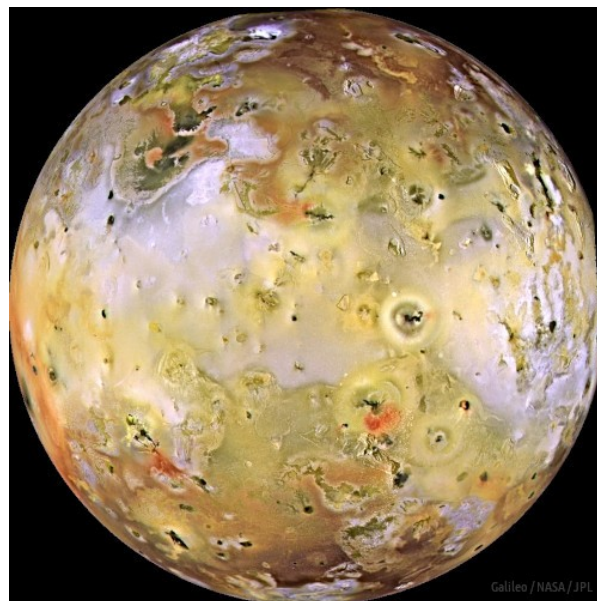
We co-authored this atmosphere, with a stress on its oxygen-contents. We as in us terrestrial lifeforms. Over a long, long, long time.

Now, it's not impossible that an extraterrestrial species underwent an identical evolution within an identically changing environment that compares excellently to Earth's history. Not impossible, but also extremely unlikely. And we sure haven't found such a world yet. Not even one about we can say with some certainty that it comes close. That doesn't have to mean much, considering the amount we still have to look at, which is still most others. But for an implication we can already find a tendency here in our own solar system.

Let's narrow it down a little, all the objects in our system with enough mass so they've formed a sphere. Starting with Enceladus size, round there. Look at all these worlds. All these many moons. The dwarf planets. The rocky planets. The ice giants, and the gas giants.

They're all different.

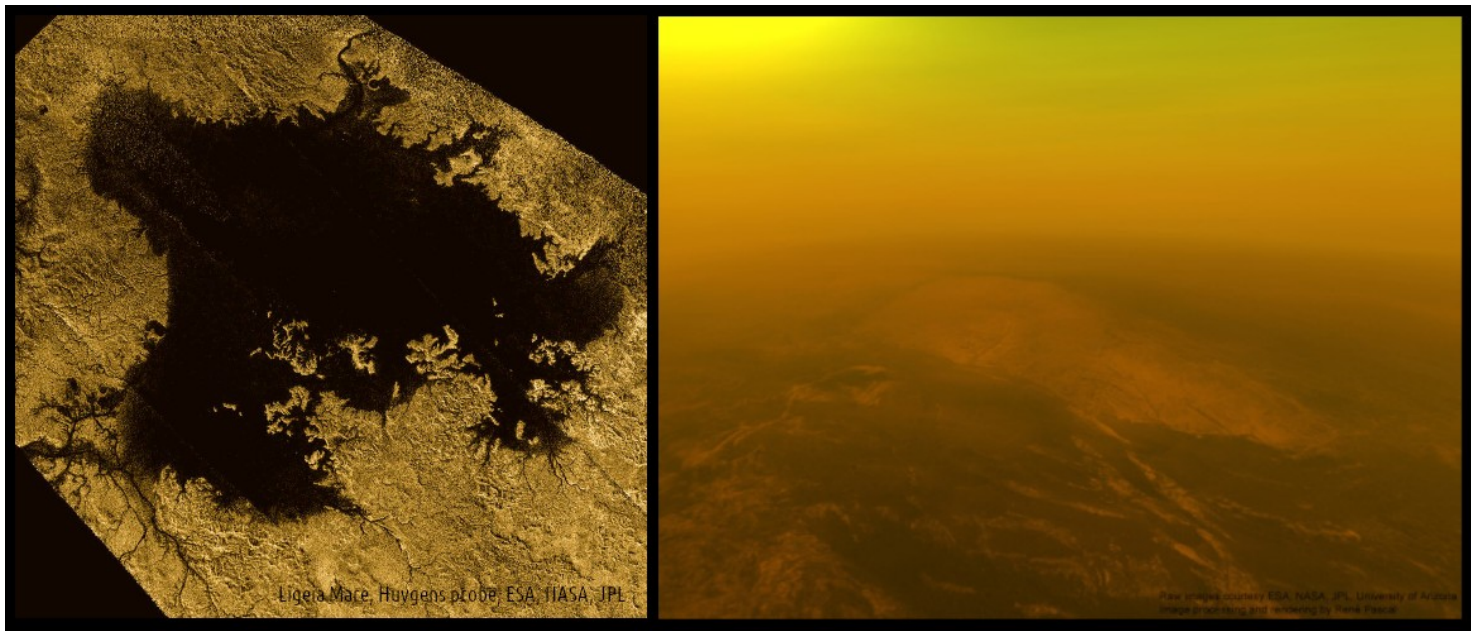
Each world truly a world in its own right. Neptune and Uranus seem to come close in composition, but we don't actually know that much else about either. Uranus, for instance, lies on its side, as relative to the orbital plane. We don't know why. Compare the four larger moons of Jupiter, Io, Europa, Callisto and Ganymede. Four completely different worlds. Some possible commonalities, many more differences. Europa and Ganymede are housing vast subsurface waters, as mentioned, quite possibly global, and both are ice worlds. Ganymede is much larger, though, has a different tectonic history, and it's not only the largest moon in our solar system, it's also the only one that generates its own magnetic field. We see what we believe might be organic compounds on Europa's surface, reddish, and possibly deposited from under the ice. Callisto is Jupiter's second largest moon, and pockmarked by a legion of asteroid impacts. And Io?²³ About 400 active volcanoes all over that moon, and it shows, descriptions vary between jewel in the sky and seriously rotten apple.



Moons come to be in various ways to kickstart their respective biographies, by massive impacts of their mother planet to be with another large object (e.g. Earth's Luna), or smaller collisions between

23 <https://solarsystem.nasa.gov/moons/jupiter-moons/io/in-depth>

clashing siblings, they can be ripped apart by their planet's gravity if orbiting too close (Mars' Phobos in the future), to disperse into rings around the planet, parts of those rings which may begin to clump and be shaped into new moons, they may be captives (Triton, probably), having started as other objects, but gotten close enough to a planet to end up in an orbit around it. They may form simultaneously with the planet in the protoplanetary disk around the star already. And from whatever start they'll have each their own, individual history, following the general direction given by make-up, locality and orbital distance to their planet, to name some contributing circumstances. No wonder that Io is volcano wonderland, while Titan has lakes- and rivers-forming methane and ethane raining.



The same applies to planets, and all other types of bodies according to our or an alien categorizing system. There are Jupiter-like planets orbiting their star at closer range than Mercury rounds ours. Which reminds us, stars are also not alike, different types, different luminosity, different mass, different, different, different.

With all this variety in mind, we come back to the necessity of our alien invader having to evolve within environmental circumstances as closely resembling Earth's natural biography as possible. Again. It's what they invented the phrase, 'I guess, everything's possible' for.

Unlikely.

If we go with the by far more likely possibility, our invader has to fancy a world that'd be just as poisonous and uninhabitable for it as really every other world is for us, and I mean fancy it seriously, because, you know, distances.

Just to get it out of the way, if we'll allow the astronomically tiny chance for two far apart worlds being this similar to another, having undergone the same changes in identical procession, resulting in very similar life that has evolved under the exact same circumstances while in reply taking part in the reshaping of its environment, and that, too, in the exact same manner, then, yes, one might seem

to have a point in suggesting that it's a good reason for coming and doing conquest, say your own identical planet is in peril. But in a delicious twist of statistics, if you should really arrive at the existence of those two accidental twin worlds, then you'll probably be able to find more. Quite simply because the improbable has just been proven observed fact. It's the numbers, the total amount of worlds, that factor in here. And if there's more than just those two twin worlds, than chances are that you'll find the third without a much resisting population, because yet another factor is how much time life had to evolve into sentience, and it would be some piece of luck (bad or good, depends who you'd be asking) should you pick the narrow window between the emergence of an intelligent builder species and either them getting themselves extinct or presently doing the same things you're doing for your discovery. We are recent, we haven't even made a lousy million years, and we're already threatening all life with extinction, ourselves included, from several fronts. And as we shall see later, that's not a coincidence.

But the chance of finding such a world already perfect for you is truly infinitesimal.

Alright, what about terra-forming? Literally, since we're talking Terra.

Sure. To a galaxy-traversing species terra-forming, planet-transforming in general, is probably school assignment. So much so that, if they can do it this easily, they could do it to a lot of worlds, possibly any. No need to laser-shoot the place up before. Just have your pick.

And that also takes care of the lesser mentioned idea of a strategically advantageous locality. I mean, the original argument compares them to our behavior, and we sure battle over barren rocks in the sea for this reason, in fact we go as far as to actually build these rocks.



In the context of incitement for a capable alien species to come here the appropriate answer to this is: dude, you know where you are...?



So much for real estate as a good reason to come and steal it from us.

Nope.

Enough places within more than enough space. No reason to start some shit over.

Naturally, all the above goes for the threat of galactic real estate developers as well.

At this point, with the place itself and everything that goes with it not being a reason to come and conquer for a species of extraterrestrial intelligence old and smart enough to know much more about the universe than we do, at this point Tim Burton's Martian hooligans make a lot more sense than someone popping in for the malignant purpose of theft, because there's just no equation resulting in 'dummies stumble over the secret of interstellar travel'.²⁴

Left to wonder how realistic those hooligans are. Not necessarily gaak-gaak, dove roasting and Washington Monument Bowling, but you know. Could the purpose for such a visit be sheer malice?

3. A Question of Kumbaya: Shared Properties

There are a few other possibilities the fearful will think of that haven't yet been explored in this little effort, such as a galactic zoo, us in cages with a mock-up of our natural habitat, armchair, television set and all, perhaps a tire dangling from the ceiling. This one and a few others belong into this section, the way I see it, because it shall culminate in the question of ethics, more specifically whether we can count on aliens having any.

But this section is rich. It's what makes the subject a truly rewarding one to think about, beyond the plain logic of the previous ones. And we need to start with the basics.

²⁴ Mars Attacks!, 1996, written by Jonathan Gems, directed by Tim Burton

Ask yourself: is there perhaps something we can positively say we have in common with an intelligent alien species? To remind ourselves, we're talking about a species we haven't yet met, and we don't know where they live, we don't even know whether they in fact exist. At this point, and to us, they're a hypothetical. We have established that it is highly unlikely that their story, if they exist, is so similar to ours, their environment so similar to ours, that they could breathe what we breathe, eat what we eat, or look the way we do. And to neither we have an answer to replace our notion with, we don't know what gases they breathe, we don't know what they eat, we have no idea how they look like. If we'd be talking about the Upside Down, having already encountered some of the strange creatures populating it, we could speculate that there are quite probably more species of frightening animals (so far they all seem to be predatory, no wonder they act so extremely ravenous once a Downside Up-human comes along), but we'd have little of a frame of reference to go on as to how they'd look and what they'd do with their night, except that here we'd know the environmental conditions.²⁵ With aliens, about the existence of which we can only speculate, we don't, so we don't know their history, and without knowing it – what can we actually say about them? Is there anything we can say?

It gets worse still, because we don't even have a firm grip on their starting point. Life on Earth has followed one path, as far as we can tell. And actually we're having troubles telling things here as well. Definition. How it came to be. If we're not crystal about our own starting point, the more we'll be in the dark when it's about hypothetical aliens.

Viruses are seen as controversial because they tick off some of the criteria which we have established for the definition of life, but not others. Quite a lot of people thus deny them the title, and for now they're being cautiously rested on a brink position – we think that the precursor to life as we know it had been replicators similar to viruses.

But if we look at the rabies virus, for example, we have such a replicator, an extraordinarily simple *thing*, a wad of RNA, some proteins around, this membrane spiked with some real good master keys, and that's it, and it manages the following: it enters the body of a mammal by means of another mammal's bite, seeks out the nerve fibers to travel to the brain, by this choice of travel circumventing both the body's immune response and the blood/brain-barrier, invades the brain to do we're not quite sure what, but quite possibly to overstimulate it, causing besides painful and frightening spasms a multi-color emotional response of fear and aggression, while also collecting in the saliva glands, and to make sure there's enough virus-carrying saliva in the mouth it creates hydrophobia in the victim, a rabies-unique syndrome that causes the patient's throat to violently cramp whenever a liquid, e.g. water, is seen, leading to an aversion to, at times outright fear of water, as well as growing thirst, with every attempt at drinking causing more throat spasms, ensuring increasingly collecting saliva in the mouth, with almost all mammals who grow fearful and violent using their mouths for defense, thus leading them to bite, and to the virus invading the next host.

That's pretty elaborate for a *thing*.

I might be tempted by treacherous intuition here, but perhaps rather than flat out denying the virus the prestigious honor of being called a lifeform we might prepare for expanding our definition a

25 Stranger Things, 2016 (1st season), created by the Duffer Bros.

little. And we've been wondering about it. One way life went here on Earth, only one. All to trace back to one beginning. Nothing else to compare it to. No second biosphere of an altogether different life proven or indicated, at least as long as we hang on to our set of definition requirements. Life as we call it is life as we know it, and that's carbon-based, because we wouldn't know any different.

Alternatives have been suggested. Silicon is the most prominently proposed alternative candidate, by far not as promising as carbon. Michael Crichton's threatening micro-organism in 'The Andromeda Strain' is eventually revealed to be of crystalline structure.²⁶

All of which widens the potential field and makes this question an ever harder one. Is there really nothing we can know for certain? Nothing we can state about the alien with conviction beyond a reasonable doubt?

Ask the question in the classroom. Children are good at forcing us back to basics. The most predictable answers will probably concern visible physique: they have eyes? Ears? Arms and legs? Most adults who spend some time on this question will immediately shake their heads, but we should take the time and pause here for a moment, because although eyes, ears and legs cannot be the answer to the question as we're asking for a definite positive, it is actually quite probable that our alien does have eyes.

The human eye is a frequent subject employed when creationists want to prove the existence of a deity. Something as intricate and complex as the human eye can't have happened by chance, they say, it's got to have been made. Besides the sadly common mistake of attributing a game of chance and nothing else to evolution, there are two responses immediately coming to mind. Firstly, if you want to argue evidence of divine craftsmanship by example of a highly complex organ, why not picking, say, the human brain? I'll leave that to others to decide.

Second, you might really want to switch to the brain, because our eyes suck compared to others. You wanna talk eyes, how about the eagle's, the hawk's, the owl's? Bird eyes in general. Even the jumping spider's eyes. Birds of prey can not only spot details from impressive distances, they do so in fast motion, often times with those details belonging to fast moving prey, sometimes fast moving prey under some quantity of light-diffracting water, and they're able to strike spot on. Owls do the same with very little light to aide them to start with. Meanwhile our eyes project an image *upside down*. Our brains have to first correct this nonsense. Even the best human eyes are not providing particularly sharp images, with this unsatisfying sharpness all too often quickly declining, with many humans very early on. You don't see many eagles around that require glasses. If creationists were right, their god won't be expected to win a designer award any time soon.

That aside, eyes are ubiquitous. And not only that, they appear in many forms, many solutions have been developed to make the best of the presence of light. A jumping spider's eye looks and works differently than a falcon's. And since a jumping spider hunts with its legs and fangs its eyes are much, much better than the eyes of, say, an orb web-building spider. Flies and bees have not merely two eyes, they have hundreds combining to clusters, each single eye providing a facet of the world, all of which combine to a broader image. *Pelvicachromis taeniatus*, a small West-African fish, can make use of the infrared frequency of the light spectrum. Try *that*, puny *Homo sapiens*.

26 Michael Crichton - The Andromeda Strain, 1969, Knopf, ISBN 0-394-41525-6
The Andromeda Strain, 1971, written by Nelson Gidding, directed by Robert Wise

With the same kind of organ as specified by function evolving into radically different organ specimens as per way of functioning it's obvious that they evolved independently from another. We have legions of eyes, different eyes functioning on the basis of different principles to achieve one and the same goal, all across many species from different families, resulting in a thoroughly surveilled planet.



Just a few of the many eyes evolved on Earth, including the latest one

Why?

Because the incitement is the same. Light is commonly appreciated by terrestrial lifeforms, not only for its properties that provide the basics for sight, but also. It's an advantage to have, sight. You may start with cells that can distinguish between light and shadow, say by warmth, and your next descendants may soon be able to tell when a predator is swimming above. From there it's refinery over the generations, until a descendant that's now already another species is actually able to see that predator. Whenever there's something to be made use of in an environment it will be made use of, and on Earth any such idea is picked up many times over – separate groups of students independently working on the same physics project, the resulting engineering descriptions will differ. Use friction and a flammable substance to make fire, and you'll come up with the lighter. Or the match. Or a stick and some dry hay.

Now, can we say whether extraterrestrial lifeforms on planets or moons in other star systems have the same inciting impetus of light that's likely to trigger the development of some eyes?

Yes, we can. Because it's a *star* system. Stars, as violent and capricious as they are, they're the first component to eventually result in and co-provide for life. You have a star, you'll have light. Seeing how potent an inciting influence light is over here, it'll be the same over there.

But what if they evolved underground, with no light?

Remember our premise? They've come here. That's a very hard thing to do if you don't first get to your home world's surface in order to leave it. And without curiosity you have worse chances to get sentient, so they'd have made it to the surface much earlier already. Plus, even where star light doesn't reach, the inhabitants of those environments still seem to really want to see. Light is that popular. At the far depths of our oceans, to us pitch black, the angler fish and others went as far as creating their own light, to bait smaller fishes, which only works if those smaller fishes can see. If you crawl into the darkest recesses of the deepest caves you might find yourself surprised by the sudden presence of glowing light, emanating from fungi.

What goes for eyes also goes for ears. Atmospheres are another fashionable accessory of celestial bodies. Even Pluto got one. In space no one can hear you scream, or fart, but an atmosphere is a medium through which sound can and does travel. How it then *will* sound depends on density and composition of the atmosphere. You have a medium enabling the detection of sound, that's another incitement, and developing an organ to do the detecting will serve as an advantage – rest assured, ears are on the way.

Your world is an ocean world, completely covered by a liquid? Even better. Water, for instance, is a better sound conductor than gaseous matter states. Terrestrial whales can communicate over hundreds of kilometers with another.

And what about extremities? You can be pretty successful as a stationary lifeform. That's a shout out to all my plant friends. But even the smartest grass will need a hand if it wants to board a spaceship and go to another planet or moon, unless it'll start to grow means to move on its own accord. So yeah, if we're thinking of aliens that are either a threat or teachers or new mates by the virtue of the potential of coming here, they likely do have something like legs.

So the kids are right by probability. But not by certainty. We recall, we haven't yet met the aliens, and we specifically don't know which of these enhancements they use, and on what precise principle these organs function. We can speculate that they'll have some. But we don't know which, and what they are.

So that's not a positive.

But there's one, a very fundamental, very consequential one, and if you haven't thought of it yet, even though it's been mentioned throughout, ready head and brow for a defty face palm.

The one thing we can be absolutely positive about having in common with an alien species that we haven't yet met and of which existence we cannot be certain, is that they, too, would have evolved.

Alternatively you may groan and shout, 'yeah, but come *on*, now!' Well, if it was that obvious then why not saying it? Especially since it is *that* consequential.

That consequential for the answer we're trying to find, too. The answer to whether or not they'd come in peace.

How does one do that, evolving? The simple take, which is lifeforms evolving from simplicity out into complexity. Just as a side note, if you consider yourself to be someone special, someone better or more important just because you're the current lifeform hanging from the youngest leave of a particular evolutionary branch and happen to be relatively complex, there are plenty comparably

much simpler lifeforms and other forms that are very successful, thank you very much, and that so without edging everyone else towards the brink of extinction. And beyond.

And as we've discussed, there are beings so simple, many among a somewhat more complex species even doubt that those are even alive, and they might represent an intermediate stage between form and lifeform, but are as successful as ever, so they say, 'we're good'. Life has probably started as the right ingredients that are abundant not only here on Earth, but without yet combining to the definition we accept nowadays. As replicators, doing what today only viruses do. And once something emerged from this that would meet our presumptuous criteria, it was still different, its environmental requirements not meeting ours.

Safe to say, in any case, it was simple. Fast forward, and we got nervous systems amounting to brains that extend the desired physique into buildings, clothes, machines and virtual spaces. It all started with simple single cell organisms that would count as extremophiles today.

And being unicellular was all the rave back then. And remained so for a long time. The first life appeared early on our planet, already after the first billion years or earlier, and possibly more than once, and possibly on more than one spot.

The first time one of these single cell organisms went, 'hey! Why not trying with a backup cell...!' did not occur until a mere 600 million years ago. Let that sink in for a moment. For the much, much greater bulk of the time everyone was just cool with being unicellular, going multicellular only happened recently. On the face of it that's actually a potential bummer where it concerns life elsewhere. We don't yet know why multicellular kicked off so late in the terrestrial game of life. Whether there was something inhibiting the story of the more complex organism consisting of more than one cell. Or whether being a single cell being is just how things are normally. If the latter is the case there's a better chance that life in the universe is predominantly unicellular, that the cosmos is populated mainly by microbes.

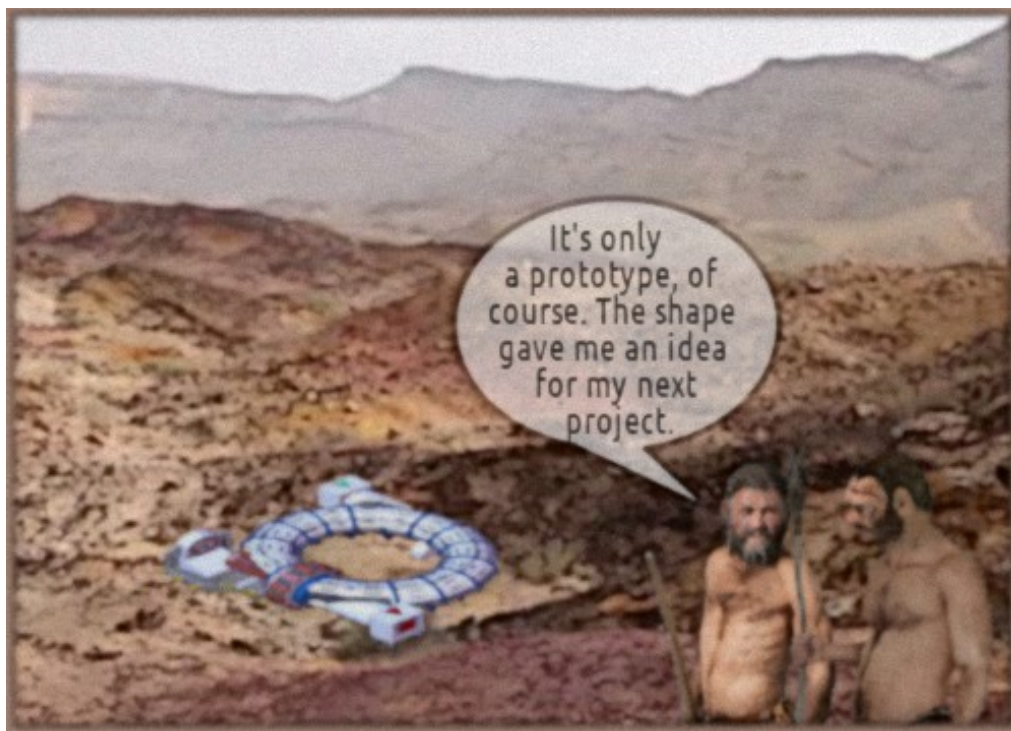
It may not seem that way to terrestrial complex smartasses, but Earth actually is, single-celled microorganisms make up the majority, and if you count viruses to that, then it's a real vast majority. The good news is that the sheer number of worlds out there still provide a good statistical chance for plenty of complex beings establishing societies and civilizations.

Anyway. Simple unicellular first and later lifeforms eventually did evolve into multicellular, and ever more complex beings, and from there it was a continuous branching, and once the dam was breached, once life had started the extra cells-thing, it went overboard. In a continuous flow of branching and re-branching, obviously creating families, cousins and siblings, main branches, dividing branches, twigs and buds, and all numerous times over, plants, animals, and beings that didn't want to be either, trees, bushes, shrubs, lianas, water plants, surface and subsurface, and tumbleweeds, at some point tumbleweeds, what gives, fungi of all sorts, insects, spiders, fish, amphibiae, reptiles, birds, and the famous mammals. Tendency out from the water and onto the land, and then back sometimes. Life constantly testing itself against the challenges, constantly reinventing itself, with the incitement to creativity and adaptation making nervous systems popular, brains, and the brains at once beating their windings before each other, whoever gets closest to being a Kubrick-species gets the upper hand.

No guarantees were given, and setbacks were included. The dinosaurs had a real good and long run, and then it was over, virtually within a day, because this thing came down from the middle of somewhere. All it takes, really. It didn't finish the whole play, however, didn't force life to start all over, just as the other great extinction events didn't, though one got real close. With the big lizards out of the way and some of the smaller ones using the opportunity to become birds, life got easier for a lot of the species that had stood no chance in getting a main say until now. Among them a small, shrew-like mammal. A long time later this mousy creature's descendants had grown quite distinct central nervous systems, and limbs of great dexterity to go with them, a dexterity that extended down to the toes and fingers of their feet and hands. Which ever of them had used trees for security at least part time came down from them, to get better at walking upright, and at intensifying the research into tool-building, which had been around for some time with a number of species.

They got good at it. So good, they eventually started using their tools to make other tools, including some they could live in. Began to reshape their environment according to their requirements instead of the old-fashioned adapting to it, turning the whole principle around. Long story short, it was the dawn of human, and as it goes with dawns in evolution, no one's entirely sure how long it took. Pedants might say, well, it still does, so...

And here they were, and they built houses, and then they went straight to work, building the Large Hadron Collider.



Right. So not right away. Why, what took them?

Same thing, really. You might evolve a great brain, but as for a species, this brain first must understand. It must learn. It must learn about the things around it it's suddenly conscious about (not so suddenly, actually).

And here the plot thickens.

These brains may have come a long way, but they're faced with limitations and inhibitions, the tools they've come up with so far don't yet help them to look beyond certain horizons, because their designers, the brains, had not yet seen those horizons, and had therefore not felt the need to address possible means to do so. Their bodies did most of their chores just fine, even though they broke easily and got sick and died all the time. But they couldn't get higher than back up the tallest tree, or up a mountain. They saw rocks as good material for spear tips and artificial caves, and as ammunition, but they didn't yet recognize their value as volumes of a biography, and hence they couldn't look far enough into the past, and with enough accuracy. They had not yet established the disciplines of chemistry and physics, they would not have understood what these strange words mean. All they could really do was looking about themselves and wonder. Muse about what they saw, in their spare time, and preferably not out in the open without clear view on what could be coming at you. A lot of information was yet to discover. Like life they, too, started this whole sentience-consciousness-learning business from scrap.

Which will inevitably lead to mistakes being made, to misconceptions, and we cannot stress this enough: *inevitably*. Where the rise of sentient species is concerned geniuses don't rain from the local sky.



You're a budding civilization, and what mistakes you'll be making, how many, and how grave and avoidable they'll be, depends. Largely on you. Some will be hard not to make. For most of the time our ancestors had no means to look far into the past, beyond their own records. Regarding the world they lived in, it's understandable that they'd conclude it was theirs, as it offered all they needed: air just perfect for them to breathe, water to drink, food to grow on bushes and running around, with

sharp rocks abundant to be forged into spear heads to hunt down the running type of food, rain to cool them, and later to water their crops, and rolling hills and lush forests to please the eye. It must have seemed provided, as if it had been intended for them. Intended by whom? Made by whom? Couple that with our innate inability to even imagine both finality and infinity, and with the horror of seeing that beings die, ourselves included, which not only is something one wishes to reject as a reality, but which is also unimaginable as a finality, and runs contrary to our experience of experiencing – something like religion seems inevitable.

Other mistakes had still been understandable, but not unavoidable. There are always people who're quicker, who get the right idea simply by considering the alternative, and they won't always make it into the history books. By and large we can say that most people before Copernicus, and most still for some time after, believed that the Sun orbited the Earth, and not only just because it seemed so, but also because Earth had to be the centre of the universe, because humans were.²⁷ And that would be an example where we'd been confronted with only two options, and I'll leave it to others to decide whether things are simpler or more complicated for folks living in a binary system, or even count three stars as theirs.

A stubborn myth has Columbus having been extra brave, because, after all, he must have considered the possibility that he'd be wrong about Earth being round, and that he could well fall off the edge in his search for India. That might have been the case for a possibly fearful, less educated crew, or to be more precise, a crew that, according to its class, would have been *kept* less educated. But Columbus would have known better. That Earth is a rough sphere had been known since the antique, since about 240 BC, when Eratosthenes not only proved it beyond any doubt, but even calculated its circumference with an astonishing methodological technique called sticks in the ground; he was off only by a tiny percentage.²⁸ His results weren't obscure texts that had to be re-discovered, they had been well preserved and studied throughout.

The establishment of the scientific method was a huge step. It provided us with the means of developing hypotheses and theories based on observation, to rigorously and repeatedly test those ideas and observations, and to expose them to other brains to conduct their own reviews, and to thus either dismiss or support our findings. It's the tool that has told us everything we know about the planet we're living on and the vacuum we're sailing through, and what it contains. A lot is still missing, but the amount of what we've learned in the latter and much smaller portion of our presence, and the amount of false assumptions we were able to correct accordingly, is astonishing. And henceforth we move forward as the ever wiser custodians of one world, getting ready to explore ever more others.

If only it were so. Anyone deeply invested in finding out stuff about the universe we live in has probably been asked this question at some point: 'how come you're so interested in all this?' It's usually asked with genuine curiosity. Depending on how rotten or not the day is, I got three answers to choose from. I feel lousy, and I'll be damned if others will feel better, so I'll snap, 'yeah, well,

27 https://en.wikipedia.org/wiki/Nicolaus_Copernicus

We should be fair and mention Aristarchus of Samos, who was a tad quicker than Copernicus, historically speaking, which serves as a point in arguing that discoveries such as Copernicus' can be made much earlier, and that the sequence of history as we see it in retrospect is not a natural given:

https://en.wikipedia.org/wiki/Aristarchus_of_Samos

28 <https://en.wikipedia.org/wiki/Eratosthenes>

excuse me for not having picked a more exciting topic than, you know, the world.’ On slightly better days I may simply ask, ‘how come you’re not?’ On good days that allow me to view things in better context I’ll go, ‘well, it seems you’re just as interested. Here I am, telling you about a spider cribellum and the arms race that seems to be part of for what’s now a small eternity, and you haven’t killed me yet. In fact, you haven’t fallen asleep either.’

The interest is there in many, but it’s buried, and the trouble is the sand and soil begin slipping again once the conversation is over. The fewest will continue the research at home on their own. There’s some priming in that, starting with few school lessons having been enjoyable. Who among you have had a math teacher who’d opened the very first lesson by asking the class, ‘okay, what are numbers?’, to use that entire first lesson to let the class discuss then, to emerge with puzzled faces, and to take it from there. The first class in any subject should always be a philosophy lesson. For teachers it’s often hard to maintain the original passion that should optimally have compelled them to teach their respective subjects, but from time to time they ought to remind themselves. If your style of teaching results in a drag for the students, and if you can’t change anything about how you teach, then it’s time to quit, to shift aside for a more enthusiastic teacher. That might sound brutal, but what’s at stake here is the students’ own passion. They all had it as children, and the first institution likely to suppress and destroy it is parents, no need for teachers to make it worse – your job is the opposite. And without passion there won’t be much learning, and the consequences are grave.

The problem of misinformation isn’t a new one, it’s only being exacerbated²⁹ by our media’s possibilities that are on offer not only for our benefit. And we won’t solve it, not unless we first solve the problem at its heart: *lack* of information. Not knowing, not knowing about things one should know about, beginning with learning how best to obtain reliable information. The degree to which most people you’d meet are uninformed about rather basic subjects is stunning. And it has only to a small extent to do with their respective formal education, but also.

Neither are the media solely to blame. When I got my first COVID-jab, at a make-shift vaccination spot in my neighborhood, one station consisted of a physician, who’d ask me whether I’d like to have an information talk before receiving the shot. I thanked her, and replied that I had a whole year to learn about this virus. Her own reply was standard, and came right out of its compartment, and sounded like it: ‘don’t believe everything you read on the internet.’ This might even be good advice for some, but if the speaker doesn’t know the other person it should actually be perceived as an insult. The sentence can be heard a lot around here, pretty much verbatim, and again it depends on the mood of the day: ‘not everything... You mean, I may believe *some* of it, then?’ Or, ‘I see. Can you tell me what to believe?’ Or, ‘you’re saying books are better? Does that include Mein Kampf, and that lady who claims that eating certain greens is good for you because they keep photosynthesizing in your intestines, and Ron L. Hubbard, and Paulo Coelho?’ Or, ‘alright, I’ll only watch TV from now on.’

Basically what’s being said is that you don’t know how to distinguish, how to reap the value from the bollocks. And it’s meant for those who already don’t or can’t. But it’s too easy to put all the responsibility on a respective medium or platform. You can easily find the one or other horrific subculture on Youtube, Reddit or Facebook, only to turn back to your own activity, and to wonder.

29 Shaun of the Dead, 2004, written by Edgar Wright & Simon Pegg, directed by Edgar Wright

Hmm. My own Youtube experience is kinda different. I follow NASA, JPL, ESA and Simone Giertz.³⁰ I watch Hilary Hahn commenting on the music she's playing, I listen to a lot of classical music, and if there's someone typing 'Busoni sucks balls!' I missed it, and it's rare.³¹ I watch new videos from two elephant rescue- and conservation programs, generally a lot about other species of animals, news programs I know how to trust while watching critically, and I learn about Victorian and Edwardian clothes from Miss Banner.³² Generally people are civil in all these virtual places. And where they're not you can only regulate so much before usage becomes near impossible for all the hassle. Which is a long way of saying, it's us. Some moderating is necessary, and the platforms don't do the best job possible, but in the end it's us. Once again, don't let the public off the hook.

Besides malice, nefarious agendas and ulterior motives the problem of misinformation is that there's a void of knowledge that can be filled while circumventing the necessary blood/brain barrier of critical thinking. You can only mislead those with the kind of nonsense that is nonsense in an apparent way who don't know better to begin with. Those who do know better do so because the guide to critical thinking comes with the package. Doesn't mean you won't make mistakes, you will, but they'll be yours.

Carl Sagan described the discrepancy between the fast evolving technology we use and the number of people actually understanding it as a recipe for disaster.³³ I'm not much better in many respects. I just bought a new computer. I knew how to replace the OS it came with with a better one. I know how to use it. I do not know how it actually works. No idea. I'm already slightly better with somewhat less complex tech, like, say, a kettle, but not much. And that's a common theme with us and the technology we're using, often on a daily basis. We have no idea how it actually functions. How are we then to decide about its usage on the world stage? How are we to judge anything to do with technology, including the policies decided about it?

But it doesn't only go for technology. What Sagan said can be expanded to generally knowing about and understanding – things. Anything. Why the day sky is blue. Why most plants are green. Why it is so cold on Mars. Why the virus causing COVID *had* most likely jumped over from another species. Why it is indeed us who cause this rapid warming of Earth's climate. How would most people die as a result of a thermonuclear world war, and how many would die in the end. You can conduct your own survey, by asking as different as possible people on the street a few basic questions: how come we have seasons? What color is the Sun? And, why is it so cold on Mars? See how many people get it right.

The mistakes we make that result from ignorance where the information needed to know the answer is freely available, and that was never the case to a degree as much as it is today, are unnecessary. The farther you go back into the past, the harder it may have been to know better, but sometimes we think too little of what could have been known, and too much of the relevant contemporaries. In 1878 the visitors at the Universal Exhibition in Paris beheld a strange sight. A man by the name of

30 <https://www.youtube.com/c/simonegiertz>

31 <http://hilaryhahn.com/>

32 <https://www.youtube.com/channel/UCSHtaUm-FjUps090S7crO4Q>

33 'We've arranged a global civilization in which most crucial elements profoundly depend on science and technology. We have also arranged things so that almost no one understands science and technology. This is a prescription for disaster. We might get away with it for a while, but sooner or later this combustible mixture of ignorance and power is going to blow up in our faces.' Carl Sagan - *The Demon-Haunted World: Science as a Candle in the Dark*, 1995, Random House, ISBN 0-345-40946-9

Augustin Mouchot presented a large funnel-shaped object, looking much like a telescope dish, and he used it to produce a block of ice. It was one of the first solar power generators, and Mouchot won a gold medal for it.³⁴ And thanks to him and others we lived happily ever after, winning our energy cheaply and cleanly from the source that won't run out for another few billion years, equality fixed, pollution fixed, and no danger of climate change by us adding greenhouse gases into the atmosphere.

Right, that was in another universe.

Instead the fossil fuel industry began lobbying immediately, and the argument that coal was cheaper is one I heard made for oil in my own lifetime. At this point solar energy has already overtaken fossil fuels in being cheaper, even though by far most people still use fossil fuels. That's a first in economics, but it comes real late. Imagine our world had it been understood back then that new technologies are always more expensive in their beginnings, but that this one was tapping into a resource that's just there and won't produce the additional costs of having to deal with waste and side-effects, both the financial and the existential costs. That we don't live in such a world might turn out to be the most tragic of our mistakes.

The warming climate is not the only massive danger threatening us along with most if not even all other species. And though it might not seem at this point, some of the others are related, and where they aren't yet, they will be at some point. Right now the majority of refugees who have to run for their lives do so because of wars and economic hardship, and they already encounter the additional hardship of not always being welcome. But there are already those whose home is under threat by the consequences of the warming globe. Island nations who can't harvest because of salt water seeping deeper into the land's soil. Many regions will simply become too hot to live in. Expect a massive increase in ecological refugees, and those not to replace the refugees from wars, but adding to them, as wars will not only continue to happen, but tensions produced by some of the consequences of climate change will increase the likelihood of new conflicts. And so – will you all welcome the much increased numbers of refugees with open arms? You're being counted on.

Only one of the matters readily exploited by totalitarian movements, winning over those who, again, do not care to do their homework. We are watching the far right's momentum all over the globe. One of the phenomena made use of is what we can call information lock: the tendency to learn of a certain version, be it of events or of how a subject is to be understood, and this version already being more readily accepted because it corresponds to a preference or a grievance, and it then being so fully integrated that it locks into place, and it locks into place for good. No matter how reasonable an objection will be, no matter how good a logic, the beholder of the version in question won't give it up – it has become fact, and every reason to the contrary will be filtered out, and very effectively so. Nothing new to learn about it. Add this to any given ideology, and you'll have a problem.

It's no different with the far left, meanwhile. Ricky Gervais has nailed it by calling out the extremes as not being opposing ends leading away from another, but as a circle, eventually meeting – and probably still fighting another. The tendency of combining all critique, including careful caution, as hate speech is strong on the far left, and bears the serious danger of deactivating some of the most

34 https://en.wikipedia.org/wiki/Augustin_Mouchot

formidable weaponized brains we have against extremism on both curving sides. Selective anti-science attitude is as widespread on the far left as it is on the far right, and here there's the additional danger of liability: you may be a good fighter in the arena of climate change, but if you refuse to do what you rightfully demand of the deniers, namely to look at the science where you fear it might inconvenience your own views elsewhere, then all it takes for your climate change-denying opponent is to be half as smart as an ass and point that out. And I'd rather not have you enter the ring.

It is not a coincidence that all these massive threats our world is facing are currently converging. That they are about to merge. That they're about to create additional problems. That's what attention-demanding threats and problems do: they get worse over time, and they'll get ever more complex, and ever harder to solve, as ever more facets have to be considered. And that means that the longer you wait, the harder the work, the bigger the work load, and the more severe the sacrifices you will have to make, whether you'll want to or not.

What is a good definition of 'civilization'? My own is 'the many who together manage to get their priorities straight'. If you think hard about it, it covers pretty much everything. And according to it we have no right to call ourselves one yet.

Danger assessment is a curious thing with us. A proper danger assessment, I'd argue, consists of 5 steps:

1. what is it, what is the actual thing we're talking about,
2. what would be its effects, its consequences,
3. how likely is it going to happen,
4. what can we do about it, preemptively to avoid the thing from happening, or actively when it is already happening, and
5. what *are* we doing about it.

Because the number of people who are good at 1. - 4. is small, and because they as the people who are good at it because they're dedicating their lives to the study of the respective thing are *not* the people in the relevant decision-making process (why should they be...), nor do they constitute an informed majority changing who these decision-makers are, we as a species really, *really suck* at 5.

Relate this to all the threats that are serious ones to all of us, that could end our budding attempt at a civilization, that could even end us as a species, could even end life on Earth, add a few you probably don't think of right now (e.g. the reason why Mars is so cold and why as a concern this should really be a priority for us – I'll give you a hint: 2 out of 4), and see how well we're doing. How ready we are. That's your homework, otherwise this will evolve into a book.

And what are people most afraid of? Sharks and spiders.

So now imagine Klaatu, standing before his saucer, giving the address to the handful of press and others before his departure.³⁵ Revealing why he's come here.

35 The Day the Earth Stood Still (Wise), 1951, written by Edmund H. North, directed by Robert Wise

“Xcuse me, um, Mr. Klaatu? D.C. with Associated Reason. Glad to have you, I got a billion questions, er..., since none of my colleagues are asking..., but I understand you’re pressured for time, so just one: if I understand you correctly you came to warn us that we should cease with our destructive behavior, otherwise Gort here will come back and put an end to it before we can carry it to other star systems, that correct? Well, with all due respect, Mr. Klaatu, but if that’s why you’ve come..., again, really glad you did, you’re very welcome, but if that’s the only reason you could have saved yourself a trip. I mean. If we don’t change in this sense, we’ll never even make it to the next star. We’ll get ourselves extinct long, and I mean real long before we could find out how to even do that. Thought you’re supposed to know things like that. No offense, your visit has done good, but for a motive the other one who looked like Keanu Reeves had better reason for coming.³⁶ Will look...’

Barring really unforeseeable twists and turns, we can be pretty certain about this. Like with the problem of misinformation not being solvable without tackling its underlying core problem, lack of education, formal and informal, we won’t acquire the status of true and worthy custodians of this planet, we won’t make it a better place, we won’t become a civilization worthy the name, and it can only be a global civilization, if we don’t make a fundamental change to our attitude. To our core position, to our core selves. We won’t, and we won’t make it to the next star system, because we won’t survive without making this shift.

It’s a hard thing to do, because it has to be done by 7.753 billion different individuals, with the number steadily growing. With the problems caused by the traditional general attitude growing alongside it. What did we identify as the fundamental blemish of our kind? Chauvinism. It’s what we need to rid ourselves off, and with it we must reject ideology, which is even harder. We must become anti-ideologists. In order for our descendants to walk the shores of distant worlds in other star systems we have to start becoming them.

It’s hard, but it’s not impossible. If you have a child, ask yourself, do you love your child? It’s not just a given, there are plenty of parents who demonstrably don’t. But say with you it goes how it’s supposed to. How about her son? She’s only five? Okay, but say she’ll one day give birth to a son, will you love him? Also not of course, for all we know your grandson might turn out to be a dick. But again, granted, he won’t be, and you’ll love him. How about his children? Theirs? How about his children’s neighbors’ grandchildren? Yeah. It’s getting harder with the distance. They’re not even in the planning yet, they don’t yet exist, and when they will, if they will, you won’t any longer. It’s also getting ever harder with tribal distance. Not your descendants family-wise, not from your country, not from your continent...

Love is a strong and precious, and totally overused word. For most people it won’t get much easier when we replace it with ‘solidarity’. Hard to even emphasize with people a few generations in the future. And yet that is precisely what we absolutely have to do. And it’s not even a new thing.

There is an Iroquois tradition, and as I understand it it’s similar among most if not all Northern American First Nations, of the Seven Generations.³⁷ With each and every thing you do consider its effect down seven generations in the future. I take 7 as a symbolic number. And that’s it. That is what we have to learn to do. If we manage to make it part of ourselves, if we manage to integrate it

³⁶ The Day the Earth Stood Still, 2008, written by David Scarpa, directed by Scott Derrickson

³⁷ https://en.wikipedia.org/wiki/Seven_generation_sustainability

into our individual and global mentality, if we'll make it the hallmark of our species, we'll be on our way to do away with chauvinism, egoism and rape culture. We'll better our relationship with the other species we share this pebble with, because as a real change it'll leave us no choice to see any other human, near and far, as a sibling (that's *not* the Kumbayah-bit, you have a right to hate your brother's guts), as we have to truly embrace the reality of the other species being our cousins – and there is really nothing degrading about this, on the contrary.

This radical change in our mentality is the true next step to the stars. With all my passion for all space programs, but secluded from how involved the majority of people on this planet really are, and given that we no longer have the luxury of a good understanding of the workings of the world resulting from the discoveries of a few only seeping through to the rest after some time, and given that while the achievements on behalf of and in the name of science are enormous, but are being countered by an equally powerful tendency towards regression, there might eventually not *be* a world to launch from.

Now, it may very well be that our aliens' ancestors got some of these things right much earlier, compared to how long we took and are still taking. It may be that smarts had been valued appropriately much earlier, and there are consequences to that, too. Other societies out there might have been even dumber than our majorities, and would have perished within an even shorter time, accordingly. Remember, depending on where we set the approximate famous dawn of our species, we haven't even made those one puny million years. Compare that to most other terrestrial species. The thing about ever bigger, more complex craniums, under certain circumstances they can eventually get in the way.

But regardless of how our far away neighbors fare, fared or will fare (I see a proplyd, I wanna say 'Good Luck!'), they'll have been subject to the same principle of evolution, because that's just how things become lifeforms, and how lifeforms will progress. Consequentially they will have made mistakes, too, some of them may have been others, others will have been of a similar character, some will have been the same. Given the enormously fertile ground for superstitious beliefs provided by the infinity/finality dilemma when it is coupled with preferences regarding death and an impression of design that seems to address the beholder so apparently blatantly, I'd be surprised had they not at some point in their biography gone through a period of some sort of religion, too. They, too, will have faced environmental challenges, because habitable worlds are dynamic by nature, and they'll have responded better to some than to others, and whether they have responded better or badly would at least some times have depended on their age as a species, on how far they'd already made it, and how much chance to learn more they'd have had. They would probably have known war. Conflict arrives early between tribes, and if we're thinking of a species that has remained together throughout the eons, that's a way of living that'll inevitably cause conflict as well. And who knows, maybe they'd spent too much time on being afraid of aliens.

Challenge is a decisive factor. As an evolutionary inciter it's as potent as opportunity. It can also speed up short-term development, a catastrophe will force you to adopt some changes in thinking. This last sentence was actually quite hard to write right after the worst of the COVID pandemic. It was a true test to our readiness. Personally I think we've flunked this one. In some regions more than in others, and here is where good leadership will maintain itself – you only need to compare New Zealand with the U.S. at the height of the pandemic. Clearly a government that's proven itself

before its people will ignite trust, and with trust you can indeed lead, although it seems the U.S., the U.K. and Russia have to make do without much trust for the time being. And Hungary. And... Tell you what, why don't we make a hypothetical out of that.

Otherwise it's the good old refusal to do one's homework, with the result of surrendering one's armor and weaponry before even having spent a trip to the quartermaster. I got into one of those half-baked, half opened, half-half debates in the supermarket, with one of the cashiers and, notably, the manager, just happened out of nothing. That was quite a while after most of the restrictions were lifted. 'There's no pandemic,' the manager said in a resolute tone of voice. 'The pandemic is in China.' I should add that this conversation took place in a European country. 'What you're saying doesn't even make sense in terms of words,' I heard myself saying. The cashier was a little more willing to talk at least, with a bunch of the other customers lingering on, but one of the aspects of a battle of mediated stances is that every question seems to be poised in a rhetoric manner, not expecting or even wishing for an informed answer. A supermarket isn't the optimal setting for a debate, the man was busy, and I didn't have that much time either. Which is a shame, because of those other customers who were very definitely listening. Had there been more time I should have asked, 'hands up, those of you here who can tell me about the specifics of this particular virus. Hands up those who can tell me what a virus *is*.' It would have not surprised me had I seen no hands in the air. And my next question would have been about whether they don't find this a little strange: we all had more than two years to look at the thing that's causing all the fuss, because that's really what is at the centre, that's what this is all about, the virus, and we had plenty of additional time within this two year-frame. 'Learn how to make sour dough.' 'Pick up origami, time will fly' (should it?). Sing 'Imagine' together on Zoom. How about 'learn about viruses'? Since, you know... Perhaps they all had someone telling them not to believe everything on the internet. It'd be unfortunate if, like in my case, it would have been someone with a medical degree. And in the end, they'll all end up believing *something*.

But provided we're not talking about a species primarily composed of notorious easy-goers. Remember our premise. Challenges are there to learn from them, and sometimes the lesson will be hard. What challenges will present themselves to your species will to an important extent depend on where you live, on what kind of a world, orbiting what kind of star in what distance, and within what kind of star system. A star system where impacts by comets and asteroids are more frequent than in ours will have a society living there learn significantly earlier what to do about it, simply because they must. Another vital necessity is record-keeping. Remembering. Preferably as accurate as possible. Which, again, will be harder the farther you go back in any sentient species' respective history. Video tapes, film- and audio-tapes and digital recording means are missing on the Tree of Wisdom, so not even the serpent can help you. And once those means will be developed, having the evidence on watchable, audible record is no guarantee either, because apparently there are always those who'll believe this evidence will change along with the selections they make in their brains – and it is quite remarkable how well this can work. Attempts to falsify history are perpetually ongoing, and it is a very, very stupid move. Long-term survival depends on remembering, your mistakes, how to rectify them, the nature of a particular danger.

I'd be confident that the aliens up in our sky would have made a point of remembering. Of valuing their history lessons. Which would also result into them being familiar with any given sentient species having a comparable history of mistakes and misdemeanors.

The key-word is really age. You want to reach for the stars, you have to give yourself the time to do so. You have to create this time for you, and a lot of it is needed. You succeed, and you'll be up there next, you'll have all the fun, you'll make the discoveries that'll enable you, but you'll have to grow up from a species of selfish, moody early teenagers to one of adults first. Those who don't will already die in the kiddy corner.

Carl Sagan wrote:

*'The vast distances that separate the stars are providential. Beings and worlds are quarantined one from another. The quarantine is lifted only for those with sufficient self-knowledge and judgment to have safely traveled from star to star.'*³⁸

Sufficient self-knowledge and judgment. That's a definition of adulthood. His character Ellie Arroway replies, when asked if there was only one question she could ask the aliens she's about to meet, which one it would be: 'How did you make it?'

When we talk of the child in the (wo-)man, most of us think of playfulness, silliness, playing pranks, etc. But those attributes are not the prerogative of children. They don't make you less of an adult if what is needed is present, the ability to distinguish according to a given situation – pretty much the opposite of what an ideology is about. The true inner child in the grown-up is something dangerous, meanwhile, it's something very destructive. It's something all serial killers have in common, a childhood dragged around. It's something a lot of other people call their own, too. A child living in the body of a grown man is also what makes many aspiring tyrants the most dangerous, and it's not always as obvious as with Donald Trump.

A true adult species must consist of true adults. True adults will have learned what their priorities must be. None of these priorities will include pillaging, destroying and enslaving worlds in other star systems, because those would be priorities preventing you from developing the means to travel such distances.

Right. But what about those zoos?

Highly unlikely. This can be coupled with meeting Dr. Neil deGrasse Tyson's musings about communication between an advanced alien species and us. On their surface his observations are very valuable, in that they make a statement about the enormous consequences in brain power of even just a tiny genetic difference. Only a very small gap between us and chimps, and see what that results in. Now think the other direction, the Doctor advises, think what the same percentage *beyond* us would mean. We'd look like drooling idiots, compared. And a species traveling the stars would be quite a bit beyond that. Dr. deGrasse Tyson goes on to exemplify it in theory, by imagining an alien looking at one of our brightest, 'look, this one can do calculus, just in her head.

38 Carl Sagan - Pale Blue Dot: A Vision of the Human Future in Space, 1994, Random House, ISBN 0-679-43841-6

How cute. Our youngest did that in pre-school.’ And he challenges us with his own rhetorical question: ‘and to think that we’d be able to sit down with them and have a *conversation*?’³⁹

I’d reply the same as to the presumptuous likening of a far advanced species’ endeavors to our brutal exploits: cut them aliens some slack! Give ‘em some credit.

Because there’s some of the bad ol’ chauvinism in there, too. In the assumption of both attitude and execution. I’m being deliberately pedantic here for the sake of the exercise, as an argument for how consequential even a very small evolutionary gap is the argument is valuable.

Here on Earth in the first half of the 21st century even a dumb ape such as me already employs a different mentality when it comes to encounters with a different species. I won’t look down at it out of an arrogant intelligence contest. To start with, if viruses have taught me anything, you can be very successful without even having any nervous system. And last I checked, crows aren’t threatening every other species on the planet, including themselves. Crows do have a rather large brain in the context of their body mass, meanwhile. They’re frequently judged to be as smart as monkeys. And whenever I’m being granted an encounter my feeling is one of being privileged.

Furthermore, while I can’t sit down with a horse and just chat, there will still be communication. A very basic ability to understand the other, even when it’s another species, is vital for survival, and there are signals that work across different species, e.g. blinking your eyes signals that you don’t want any trouble.

But when wanting to interact with the horse, when I want to work with it, I must take up the responsibility that comes with a more complex brain. I’d be a fool would I expect the horse to understand long sentences I’m uttering. I would have to learn how to ‘*speak*’ horse. I don’t mean I should neigh. I’d have to mind posture, movement, when to look the horse in the eye and when not. Anyone first working with a horse that hasn’t been damaged by traditional English riding will see just how complex equine as a language is.

The one who’s, at least in theory, supposed to be smarter bears the burden of leading in the negotiation. It’d be the same between the alien species and us. Naturally there is an advantage coming with that already. Question of ethics whether one will wish to exploit that. I’d argue that if there’s already those among us dummy humans who have departed from the chauvinist attitude of seeing other species just as, variably, cute pets, life-stock or providers of for the purpose of serving as aphrodisiacs utterly useless horns, or as living, moving and eventually mentally declining images in the prisons we call zoos, or as prey for sports, if we already feature specimens that want to leave all this behind as shameful past, then you may ask yourselves: how likely is it that a species this learned will not see the value in that? Who do you think they’d send? Their version of Eric and Don jr.? Or wouldn’t they rather send their Jane Goodall?

A smart alien won’t need zoos. A smart alien would know how to observe other species within their natural habitat. So much more to learn that way. How much *can* you really learn from an innocent inmate that rocks its head manically from side to side, other than that it’s a cripple? And a smart

39 One short example of Dr. deGrasse Tyson arguing this:

https://www.youtube.com/watch?v=MqZKIfRnTPg&ab_channel=ABCNews%28Australia%29

And a longer one, where the argument is standing, as in itself it make of course all the sense in the world (brace yourself – Mrs. Patrick is intense):

https://www.youtube.com/watch?v=F200wpEpJ4w&ab_channel=DanicaPatrick

alien will know how to communicate with the less advantaged species. Always. That's its role in the encounter. I can't recall right now whether it was in the book, but in the film version of Sagan's 'Contact' (they should *really* remake this one as a series) Ellie is being asked why the aliens reply with prime numbers.⁴⁰ Why not using good old English (we recall: if English was good enough for our Lord Jesus...)? I find it interesting that she doesn't answer, 'well, it's unlikely that they speak English on their own world.' Instead she refers to the many languages we speak on ours, with the message being intended for all of us. Later then, spoiler alert, she does speak with the daddy image the alien make the encounter easier for her with in English.

And that's not at all improbable. Because a smart alien will have a look before coming. Not just out of the kind of strategics that may worry some, but also in order to know *how* to meet this other species. To avoid a faux pas. To make it easier for them. The smart alien would foresee the possibility of cultural shock, ergo it'll want to learn about this other culture. It is quite plausible that an alien kind that wishes to come here directly will first observe us – even more plausible that they'll first send us a message, but let's stick with the premise. We shouldn't be offended about the surveillance, claiming privacy violation, because, after all, we're doing the same. We're scanning every new world we find out there for possible signs of life. And if we are being observed back by a far advanced species then I don't see why they couldn't learn every single language we speak over here. Including English. Just like we better learn some horse before interacting with one.



The bets are open how an alien civilization addressing us in French, Korean, English, Kurmanji and German would be received by our doubting and conspiracy theory-eager societies, and even within the context of their preceding observation of our planet I'm having difficulties imagining it myself, but perhaps that's just my own prejudice wanting them to display their otherness in really

40 Carl Sagan - Contact, 1985, Simon and Schuster, ISBN 0-671-43400-4

everything. In any case, there's another powerful language by which communication would be possible: mathematics.

The old question, did we invent math or discover it, can, I figure, best be answered with, discovered, and we invented an alphabet for it. Mathematics are included in Dr. deGrasse Tyson's argument, but again he favors depicting what we'd be to them and neglects tackling what they'd be to us: of course their math would have us go insane in the attempt, so it's just as with the horses, it's the aliens' task to lower themselves to something like our mathematic standards. When you talk with your pre-school aged children you'd not be a good parent if you'd grow impatient every time they struggle with understanding your explanation of the decomposition of powers in the context of the Fibonacci sequence as extended to negative integers. I mean, I don't have a clue what I just wrote either. You'll adjust to the stage of your kids' current knowledge and understanding.

Those aliens have bridged the gap between the stars. They'll have a quick look at us, and they'll know exactly how to communicate with us.

And math is yet another monolith. A species figuring out the language that describes the world, the cosmos, is capable of using, of applying an early, crude version of it by means of an early, crude alphabet, that's someone you as a hyper-smart civilization *will* be able to talk to, because you as this hyper-smart civilization will be smart enough not to be the dog owner who chides Norman the Labrador by means of a string of the owner's species' words Norman can't possibly be expected to understand, he's just listening to the colors of your voice, but you'll be smart enough to understand your role of bearing the responsibility for how the communication is to be conducted, and it's to be conducted within the range of Norman's capacities. And while Norman's species-specified vocabulary is much broader and more complex than members of our species might want to attribute, the language of math is even broader, even more complex, even when conducted in the simpleton edition of Terra.

And there's yet another marker that'll be of interest to the aliens. I don't think there's a child on this planet to whom we'd have to explain the value of a large portion of what's been put on the Golden Record.⁴¹ As with any specific wavelength along the electromagnetic scale we may pick to try and contact anyone, one may ask what the chances are that our aliens, whom we don't know, will know music. I'd say, pretty darn good. *Nomina sunt consequentia rerum*, says Dante. *Et ars est consequentia percipiendi*, says I.⁴² And it's a consequence resulting from the consequence of all the sensory organs an environment will incite to evolve. The need to reflect upon what we see and to express it is an important aspect of our need to express ourselves. Sharing is an overwhelming, existential need for the pack animal especially. At our stage we reflect and express in variation, we attempt to lay bare the otherwise invisible underneath a thing or thought, and we use art as a tool to describe what our words struggle with. But we should not feel degraded when reminding ourselves that once again we've not been the first, and that, as so often, there are also baser instincts at work.

The mating ritual of the Satin Bower Bird is quite elaborate.⁴³ The male will build a bower from dry vegetation, a sort of passage or semi-tunnel, before the entrance of which he'll place a number of

41 https://en.wikipedia.org/wiki/Voyager_Golden_Record

42 Dante Alighieri - *La Vita Nuova*, 1294. The phrase appears in one of the Latin sequences and translates as 'names are the consequences of things' – my addition translates as 'and art is the consequence of perceiving'

43 https://en.wikipedia.org/wiki/Satin_bowerbird

objects he collected, many of which are typically blue, which is remarkable, since not too many hard objects you'll find in nature are blue, and it appears the bird has adopted the trinket-aspect of human presence to his mating behavior – interestingly, there's a blue shine to his black feathers, and both the male's and the female's eyes are strikingly blue.

But he doesn't just throw those objects down randomly. He clearly appears to be very concerned with arranging, and re-arranging, and re-arranging those objects, until the arrangement meets his liking, or his hope and prediction regarding whether it'll meet the female's liking. A finished courting spot will be, for all sense and purposes, an artwork in the landscape.

So in a sense there may be a facet of mating rituals in all our arts, and if the courting now is addressed to the entire rest of the human species. As there is probably an urge to leave something of us behind, something meaningful and more enduring than our so mortal coil. It is no accident that we often refer to our works as our children.

Whatever the most urgent base-purpose will be for the individual artist, with the need of communicating our responses came the desire to express it in visual, acoustic and other terms, along the scale of our sensory input. We regard the world by relating to it. The individual who perceives itself as that, in communication with the world as if it consists of individuality (that's also the reason why we shout at our computers, give quality to a mug, and are triggered when an object has been given eyes). We rearrange context in order to find out more about the thing in question. And it comes as natural to us as breathing, and with similar urgency. When I look at all the archaic precursors of artistic expression, all those vestigial traits beneath it, and at how early such expression appeared, and at how much it evolved and flourished, I am incapable of viewing even the yet completely hypothetical alien as not having been subject to the same evolution of artistic expression. And the music on the Golden Record makes even more sense to me than the greetings.

And I burn to hear theirs. I want to listen to their music, and I want to share ours. I want to be in on the next playlist we send (nothing against Bach's Brandenburg Concertos, but I'd pick the C minor Concerto for Oboe, Violin and Orchestra, the recording with Hilary Hahn, at least the 3rd movement). I want to see their paintings and sculptures, and show them ours. I want to watch their movies. Their documentaries, too. And I want translations of their literature in our libraries.

The extent to which we've driven our arts is one more facet of our existence that singles us out, and it's one more communication device. It's not an ego-thing of mine. It probably doesn't make us all *that* special. Which is the point.

The issue of Kumbayah is quite simply this: it's not that we can say that wars will die out with the ability to travel between the stars. It's just that such a species won't start any shit for no bloody reason. If there's any danger left, it'll emanate from us. From a miscalculation on our behalf, setting a chain of events into motion that could force them to defend themselves. But even such a case I'd think they'd be able to predict as a possibility in all its permutations. And I'd also assume that they'd be able to protect themselves in a sufficient manner. If you're well enough protected as to not having to defend by attack, you won't pose a danger to the dangerous side. You can just let it glide off.

Communication won't be the problem, because it won't be for them. And communication is, here as elsewhere, all.

4. *Consequences*

The possible consequences treated in this section are the consequences of following the implied advise in the argument regarding attempts to seek out and contact alien civilizations, of advertising our whereabouts, as possibly inviting our doom, because such advise, implied or not, would in the end be to cease such attempts. In that it's not mere musing, not mere opining, but people will find themselves in a position in which they'll have to decide. After all, the warning has been issued by distinguished cosmologists, no less, by Stephen Hawking, and more recently by Michio Kaku. Their status lends weight to the idea. The more it needs to be said that credentials must not be mistaken for the argument, especially not where those arguing are this accomplished.

Any such argument that could lend support to the already numerous voices criticizing the efforts on behalf of the SETI community, voices that are habitually not well informed, must be considered carefully, as it has the potential to become a pebble in the avalanche that will bury all programs aiming at contact.⁴⁴

As they appear from Earth and from this century the chances of making contact with a civilization from another star system aren't great to begin with.

To begin with there's the unicellular to multicellular problem as discussed above. It's a potentially serious blow to all attempts to calculate how populated the cosmos and our galaxy in it is if we're hoping for multicellular life. We first have to establish whether we're dealing with an exceptional barrier here on Earth, or something that is actually the norm, in other words, whether multicellular life and therefore we are the fluke, and whether the universe is predominantly a place for microbes consisting of a cell each. Which would make what we already think of a needle in the most massive haystack a needle tip in an ocean of needles.

Then there is the sheer vastness. The vastness between the star systems, the vastness between the bodies, but also the vastness of star systems and its bodies. If we only look at the worlds in our solar system with enough mass to form a sphere we're seeing these worlds to be unique. They're all quite different, the moons orbiting one respective planet differ radically from another. Thinking of life as we know it, as it's difficult to focus on something that we, well, don't know, only one of all these worlds has life on it confirmed. One. There are more that can potentially support life, all the subsurface ocean worlds, for example, of which Ganymede also has its own magnetic field. But we haven't found life there yet. And only one world out of many within one star system doesn't mean every star system will have one world supporting life to the extent that there will probably *be* life – a star system may easily harbor only inhospitable worlds.

44 SETI = Search for Extraterrestrial Intelligence; the community has brought forth the organization: <https://www.seti.org/>

Besides the distances, distances that will have light travel for anything between years and centuries, only counting the nearer systems, a fact that will have to be carefully considered should contact be established, as short greetings like 'hi, how you're doing?' won't cut it, distances resulting in ranges that we only just begun to cover with our large artificial ears and eyes, besides those distances there's also time. It may well be that we've already received a perfectly comprehensive and absolutely unmistakable radio message from a civilization outside our solar system, clearly and obviously a message from far away aliens, and yet we missed it, because back then, in the 12th century when it arrived, nobody had yet the faintest notion about radio waves. Or any other means of texting. It might have come when we learned how to make fire. It might have come when 'we' were tall lizards not anticipating a large rock soon to follow. It might have hit the prehistoric oceans, the earliest life within them oblivious to the valuable contents of the message, it might have hit the empty vacuum of space before vast amount of gases collapsed to form our star.

The same goes the other way round. One of my favorite objections against becoming more active in the search for extraterrestrial intelligence is a speaker saying that we don't even know whether the aliens we don't know are capable of detecting radio waves, or any other wavelength by which we'd beam out a message ourselves. To which one can only reply, true, and neither can we. That's why we built all these external organs, those much more capable extensions of our bodies. But the discoveries necessary for inventing and building them will come with the progressing age of a species, because, just like every mountaineer's mountain, what's to be discovered is there. And true, our message may arrive and go unnoticed, because the aliens not noticing it are in their own 12th century. That means that the message is not *intended* for them. Such a message is only intended for a species that has advanced sufficiently enough to know about such frequencies and wavelengths, and to know how to receive them. It's only intended for them, because it only *can* be. Picture the ability of using the electromagnetic spectrum for communication as a monolith buried on our moon, or as the moment the prime directive of a stellar fleet can be lifted.

But in that lies the true hurdle of time. Compared to our solar system the universe is old. Very old. Our galaxy alone is much older than our star. Stars explode all the time, if they're that type of star, taking their whole planetary systems with them, all their planets and moons and hurtling rocks and long orbiting comets, all the possible life on some of these worlds, all possible civilizations, all their history, all their records, all their thoughts.

If they don't, there's still a lot of danger that can threaten all life of whatever kind on any of these worlds. It might lose its protective magnetic field, an absolute must for the project of life – yes, *that's* why Mars is so cold, and why it matters, because not only does the stellar wind, the high charged particles shot out by the sun, perpetually hit and sterilize the planet, it also flays it off its atmosphere (which is mostly CO₂, which otherwise would make it considerably warmer than Earth), and it matters so much because it's one of two of our four inner rocky planets to which this is happening – that's half, that's 50%, and we don't know why, but the answer may simply be that planets do not come with a signed guarantee for this inner generator to last forever). It might suffer a massive climate event. It might get hit by a comet or asteroid of unfavorable size. Or, if you fancy something exotic, it may be the very, very unlucky world that passes right through the path of an enormous gamma ray beam as purging from an exploding Wolf-Rayet star; the chances for this to happen are infinitesimal, imagine all the oceans of the solar system, subsurface included, and a pen-

flashlight pointed at one direction within them. But, you know, bad luck is just bad timing. Anyway, we might want to let go of the notion of the universe being *about* life – not only do most places we look at appear decisively anti-life, the cosmos clearly has no issues murdering life in the most imaginative fashions.

Suppose a world's life is lucky, and is given the time to produce individuals who'll come to understand what to do about these threats. Hope to all these worlds that those individuals may be in charge, or optimally even in the majority, lest a vast uninformed majority will emerge to boycott them, enabling a small minority of equally uninformed leaders who'll do the blowing up themselves. Or who'll fail or not want to regulate or end a dramatic output in environment-changing toxins. More than once it's been suggested that the reason why we haven't yet been contacted by aliens is that they only see a point in contacting intelligent species. Barnacles don't move around much by themselves, and for that reason they're not known to turn their immediate surroundings into a toxic wasteland that'll kill them. Perhaps we should ask the barnacles if they've been contacted.

Mainly, though, it's the chance of when a civilization emerges. And when it'll perish, if it does. We could be separated not only by immense spatial distances, but also by centuries, millennia, by million or even billions of years, time frames including emergence and decay of potential civilizations, and whole worlds. Regarding some or many we likely *are* separated by those time scales. Worlds end, we have no way yet of telling whether we look at a location where one such world ended. Budding civilizations end, we don't know how frequently, if this is what usually happens, or less often than we may expect, or fear. And they may not yet exist in one particular place, but will in the future.

Finally add to this that a prospective alien civilization might, for one reason or another, not want to talk to us. They might see us as too barbaric. Too far away. Or they might fear the consequences of such contact; not knowing much more about us than that we exist, they might choose caution. Not knowing whether anyone like or unlike us exists they might not want to advertise their location. Aside from that last possibility, picture that: after all this trouble, after so much time without results, after this immense search, we finally find evidence of another, currently existing civilization – and they don't wish to speak to us.



So you see, our chances are slim to begin with. If my arguments have any value at all they need to be a weight in the scales used for considering the merits and demerits of working hard not only to

find intelligent life out there, but to try and establish contact ourselves. With my arguments in mind I cannot see the remaining chances for an alien civilization's intentions as being hostile as anything but ridiculously tiny. It would require a species to violate Carl Sagan's notion of interstellar quarantine. It would require a dumb species stumbling across the means for interstellar travel. A requirement I view as near impossible.

At this point I cannot conceive of an argument that successfully counters mine. Doesn't mean that there isn't such an argument. Those proposed in Professor Hawking's warning as are public most certainly don't. To me they only reassure me about one thing: the maestro was no alien.

It's focusing on the wrong fears. Like we do with sharks and spiders. And it contributes to the danger of our kind shutting down these attempts, bereaving us of the already slight chance of what would be the most important moment in our history, a moment that would change everything, a moment with such potential for benefit it's hard to imagine. It's therefore not a small matter. Especially given the worrying anti-science tendencies of our days. Deciding against us doing our part in preparing an address to other civilizations sharing the galaxy with us might quickly turn out to be one other of the grave mistakes we've proven ourselves so prone to make.

It should also be mentioned that my own fear in this respect might well be unfounded, too, that now it's myself who doesn't give the aliens enough credit, and that any attempt to hide is futile. True, we have become a little dimmer in one area, we're not shining as much with radio waves not intended for anyone but ourselves as we used to, fewer and fewer people turn the knob on grandfather's old post-war radio big enough for every cat in the house to sleep on. We've gone digital. A lot less accidental chatter going out. But we increased intended radio communication with our satellites and spacecrafts. And there is a whole lot to tell just by looking at our atmosphere. We ourselves make use of that in our long-distance exploration of exoplanets. In other words, there's hope at least in this respect.

Epilogue: Lifting the Quarantine

Hope for what, you may ask. What is this possible big change, what are those great benefits supposedly beckoning? If not to exploit us, steal from us or destroy us, why would they even want to come here, or to just contact us? What benefit is in that for them?

Starting small: just knowing about them would already constitute a big change. From speculation to being positive. And it could be brought upon by either us or them finding the other. I feel I must add a distinction here, though. You might have heard some of those representing the people most invested in the search saying that finding life elsewhere would change the world. But finding life won't have to come as a single edition. Say we'd find simple life on Mars. Currently existing life, that is, it would have to be found under the surface. There is first the matter of having to be sure that it's not imported, an organism from Earth that has *somehow* managed to withstand the bombardment by the solar wind, although those particles should pretty much rival our best sanitation efforts.

Next we'd have to establish how similar it'd be to our life, to our microbes, if it is a microbe. If it's very similar we'd have to rule out panspermia, the transfer of organisms through impact, an object impacting, hurtling up and out debris at enough velocity to enable it to leave orbit, and to come down on another world, with the surprised organism somehow surviving impact, rapid elevation, the radiation in space, second impact, and the presumably quite different conditions on its new home world to be.⁴⁵ If we can positively rule that out, we'd have learned that a similar evolution is possible on two separate worlds twice, based on a perhaps already tide lane for life to walk. Or it shows as already being too different to be remotely related.

Would that change the world?

It would change the world of those emotionally and professionally invested. Those who understand. It would change their world immediately. The rest of the world, I doubt it. As always, that would take much longer. It would come, this change, but gradually, slowly. To me the first imaging of a Black Hole was such a change, and it did make all the headlines. I showed it to someone working at a café. 'Nice,' she said. I presume she was busy.

The main factor, however, is that we're primed. Talk about finding life on Mars and elsewhere has been around for a while, and by now people pretty much expect such a find. If someone was to remind them daily they'd grow impatient after a while, eventually disappointed. We've also been primed by our fiction. Our movies and books at once prepare us for the eventuality, while also already making it part of our thinking. In the worst cases, it becomes trivial.

Adapt this thought to the possibility of finding 'only' fossils of past lifeforms on Mars, or even 'just' the traces indicating past life – enough to change my life, even though I'm just as primed, but probably not for the general public, a public that's been talking about flying saucers in the skies for ages, but when the Pentagon actually came out saying, 'we really don't know about those things on this footage', there was so much else going on, it kinda oozed away.⁴⁶

But fossils or living creatures, it'll all be a notch up if those lifeforms are not bacteria-like. If they're multicellular. If they can be seen with a human eye. We like to relate. And we're by now more or less used to some terrestrial sea creatures looking pretty weird, should we find anything swimming in the oceans of Europa, Ganymede or Enceladus. Unless we launch something like a European Fish Retrieval And Investigation Mission (EFRAIM),⁴⁷ however, all these beings would still have to be viewed remotely by the citizens of Earth, and that makes it a little abstract. It can be anticipated that the general public will get used to the coexistence of Martian or Enceladean neighbor-species pretty quickly, without necessarily changing their habits.

Detection of potential signatures of the presence of life on exoplanets is getting easier – with the stress on 'potential'. One of the greatest ideas in the universe, light, is making the reading of the chemical compositions of far away atmospheres possible as their planets get between their home star and an observatory near you, dimming the star's light ever so slightly, with this light shining through the respective atmosphere, enabling able humans over here to analyze what it's made of. The tantalizing prospect emerges from life inevitably taking part in shaping an atmosphere. We

⁴⁵ <https://en.wikipedia.org/wiki/Panspermia>

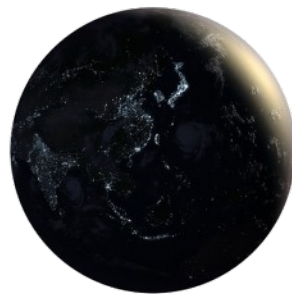
⁴⁶ The UFO or, as it's been renamed, UAP (Unexplained Aerial Phenomena) hype that wasn't really one, despite being presented extensively in the news: <https://www.bbc.com/news/world-us-canada-61474201>

⁴⁷ Just as insurance, I feel I better make sure it's understood that EFRAIM does not exist

wouldn't have this much oxygen in ours if not for us terrestrial lifeforms, and another gas emitted by life is methane, so the presence of either is always promising. Not conclusive, however, as both can result from processes that have nothing to do with anything alive.

Should we be able to prove beyond doubt that such traces do originate in life producing them, we'd know that there'd be life abundant enough on the planet in question to affect the atmosphere to such an extent. We'd not really know much else, yet, like what creatures exactly are farting or exhaling those gases, and for the wider public it may be hard to keep up attention for a 'not much else'. It would be radically different, at once exciting and somewhat depressing for everyone, if the observed gases point at a species smart enough and yet even dumber to poison and pollute their world's atmosphere.

Some exciting mission proposals suggest that we'd fly out a powerful telescope to a Lagrange point about 550+ AU from Earth, and poise it so it'll peer across the edge of our sun, using it as a gravitational lens to peer at distant exoplanets, a method that could result in enough magnification to make out surface details of such planets.⁴⁸ I'm all for it, fly out swarms of them, because I'd be particularly intrigued by the prospect of having a peek at their night sides.



Such a view as photographed would be definite proof and demonstration of there being intelligent, building beings at work (unless we'd be dealing with bioluminescence caused by a planet-spreading species of something like our slime mold)⁴⁹, and that even without as much as an alien postcard. And that would definitely turn the heads, and get the imagination flowing. And then what? Then it'd be time to decide. Writing ourselves? You know my answer.

We must remind ourselves that any exchange that would follow would go at a pace that's subject to the speed of light. If it was undertaken between us and a world orbiting Proxima Centauri b, for example, a system in which we so far haven't detected any signs of life, one such message and reply-part of the conversation would take about 8 ½ years. All other star systems lie farther away, and with some it would be a generation exchange, one generation sending a set of questions, another receiving the reply. That in itself would already bring a huge potential for significant change, if only we'll all accept it. Learning about the other's culture, history, ethics, idiosyncrasies.

48 <https://kiss.caltech.edu/workshops/ism/presentations/Maccone%20FOCAL%20mission.pdf>

<https://www.technologyreview.com/2016/04/26/8417/a-space-mission-to-the-gravitational-focus-of-the-sun/>

49 https://en.wikipedia.org/wiki/Slime_mold

Most of all about their discoveries, their technology, the things they have managed to lick, the things they haven't yet managed to lick, the revelations about the cosmos they've acquired, on their behalf perhaps whether they've had or have contact with still others. If we get to a good system of how to conduct such an exchange that's worth the wait in between replies.

The most frequently imagined scenario as far as the public goes, however, is closer to our initial scenario, the spaceships in our skies, the fact alone implying to me that they'd come with peaceful intentions as broadly elaborated above, even though them just turning up here unannounced is the more unlikely version. That, too, is priming, of course, stories involving decades or centuries between communication chunks simply aren't as dramatic. If contact is being initiated by the others, then it's most likely at first messaging. In Carl Sagan's 'Contact' the message is preceded by a sequence of prime numbers, an unmistakable sign of intelligent origin, as no pulsar will emit in prime numbers.⁵⁰ The message in that novel is a template, its contents addressed at anyone able and willing to read and decide upon it. It's an elaborate invite sent out in all directions, and those who have learned to pick up such signals, and who'd be able to build the machine of which the blueprints are delivered in the body of the text, will be able to make the decision of whether to go or not. Once again, messages like that have an intended audience, and it's the only one.

I could imagine another scenario in which the aliens indeed come here, but send a message ahead, initiate communication, to see whether they'll be welcome. Or in which interstellar travel has become so easy for them that they can afford coming to the neighborhood and establish contact from there, perhaps at the edge of our solar system, parking there, sending a message, and wait. Basically coming up to our porch and knocking at the door. I associate being civilized with being polite, so I don't think this scenario is that far off.

Should we be dealing with an interstellar traveling alien species, we'd be confronted by a far advanced, by a much older and more experienced species, and the question how we could benefit from that is, frankly, academic. The only thing that gives me pause is the possibility of the encounter with such a civilization, involving gifts of technology, resulting in us being able to visit the stars thanks to them before we're ready. *That* would be the aforementioned violation of Sagan's quarantine, only it'd be us who wouldn't belong, who'd potentially bring our havoc of chauvinism to the galaxy.

Would you call it faith, my trust in such a civilization being aware of the danger, cautious of it? Consider why I'm thinking they would be. I'm a member of our barbarian terrestrial tribe, I'm not a genius, I wasn't a prodigy, and yet already I, little dummy me, can conceive of such a twist in the history to come. You don't take to the stars without first having had a good sit-down over it.

We have to be cautious ourselves, of course – the idea is not to replace a set of deities with new ones. There's never a good objection against capable teachers, as long as what those teachers will teach us isn't nonsense. I suppose that's another benevolent effect of the quarantine. Not only should we be able to receive and interpret what comes at us from the distances, we should also be ready to meet *them*. Without fear, but also without glorifying them as gods. I am capable of learning from an earthworm. And they will be, too. And if I'm right, they'd know that good help does not necessarily lie in doing your work for you.

50 Carl Sagan – Contact, see: 34

And what about them? What reason could *they* see in contacting us, or even in coming to us? Well, there's that. Teaching and learning. Teaching, when done correctly, is a rewarding preoccupation, and learning is something one always will, no matter how advanced. One will never run out of material in a universe like this one. And one will always be able to find more in any given subject one has already investigated, such as a new lifeform.

I am convinced of the requirements necessary to make viable steps for reaching the stars. I am convinced of the mentality that can take a species there being universally the one. If I'm right then those aliens would not have lost it, once acquired. And that poses another incitement for contact. The cosmos is a dangerous place. It always will be. Observe any major crisis here on Earth, any time we face a global existential threat. The only way to meet the challenge is by doing it together, and we can see this very much from the numerous examples when we failed to pull our resources and address such a challenge in unison as well. With a universe packed with challenges of this kind an older civilization would recognize that it'd be a good idea to apply the same principle to it, to let everyone know about the other, so we may at one point have a network of the able. A very good reason to drop a note.

They could bring us, as Ellie Arroway suggested, a cosmic encyclopedia.⁵¹ They could be the ambassadors of a galactic alliance, or a trade federation. They could warn us of dangers we don't even yet know of. They could look for co-players in an interstellar game of cricket, they could look for beings to share the wonders of the universe with. Or they could come for what I believe is still considered the best reason for initiating such contact across the entire galaxy, if not the universe: to say Hi.



The title references a scene from 'The Fly', 1986, written by David Cronenberg & Charles Edward Pogue, directed by David Cronenberg, of course. The lines, as a positive, are spoken by Geena Davis.

July 17th, 2022



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⁵¹ *ibid.*